DECEMBER 12, 1960

PAPER TRADE JOURNAL

Paper Machine Wet Ends: Starting An Important Five-Part Monograph

directed at you, the papermaker
This week: stock and WW systems

Wear and Tear on Barking Drums is Often Overlooked. What Do You Do?

First Look at Empaques Modernas San Pablo's New Paperboard Mill

Editorial Dept.
University Microfilms, Inc.
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Paper sculpture by Giuseppe Baggi

Pulp from Gottesman means...

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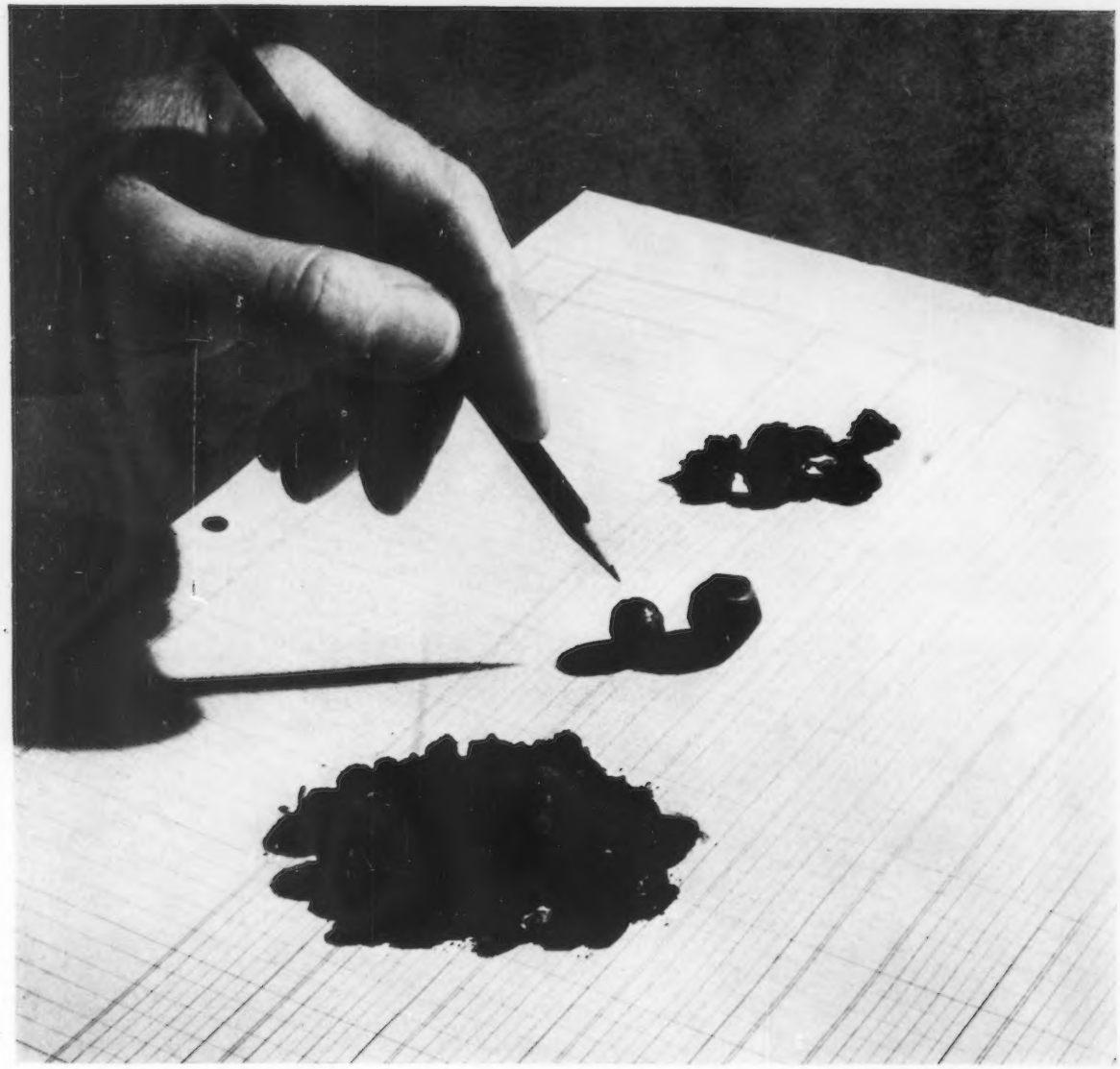

Specimens of copper powders, balls and balled sheets which can be removed from high-pressure boilers by the M-50 treatment.

M-50 REMOVES THESE COPPER TROUBLEMAKERS FROM BOILERS, FAST!

The M-50 single-stage, patented treatment* for high-pressure boilers removes copper deposits and other scales in record time. With this exclusive Dow Industrial Service treatment, copper does *not replate* on clean boiler surfaces during treatment, and small quantities of M-50 in future cleaning will help *keep* boilers copper-free. To date, the M-50 treatment has cleaned more than 300 boilers.

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D.I.S. cleans all kinds of equipment . . . boilers, process equipment, pipelines, water wells, to name a few . . . for every kind of industry. With many methods to choose from, D.I.S. engineers first analyze each job to pick the technique best suited to the specific problem.

D.I.S. also offers complete consulting laboratory service for water treatment and waste processing, backed by the technical resources of The Dow Chemical Company. For fast "total" cleaning of any industrial equipment, anywhere in the U.S.—and for literature on copper removal by the M-50 treatment—write or call DOW INDUSTRIAL SERVICE, 20575 Center Ridge Road, Cleveland 16, Ohio.

*Patent No. 2959555

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**All speeds are dependent upon machine width, number of cuts, tension, and characteristics of material.*

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If you want all the facts write today, or talk to your Cameron representative about visiting our research and development service in Dover, New Jersey, where pilot winding systems and action motion pictures tell the story of *The New Roll.*

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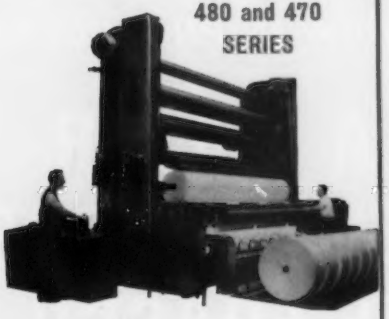

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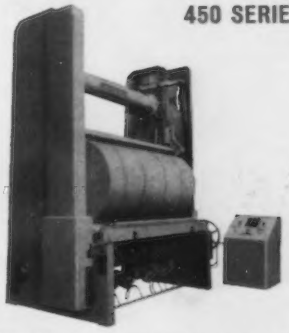

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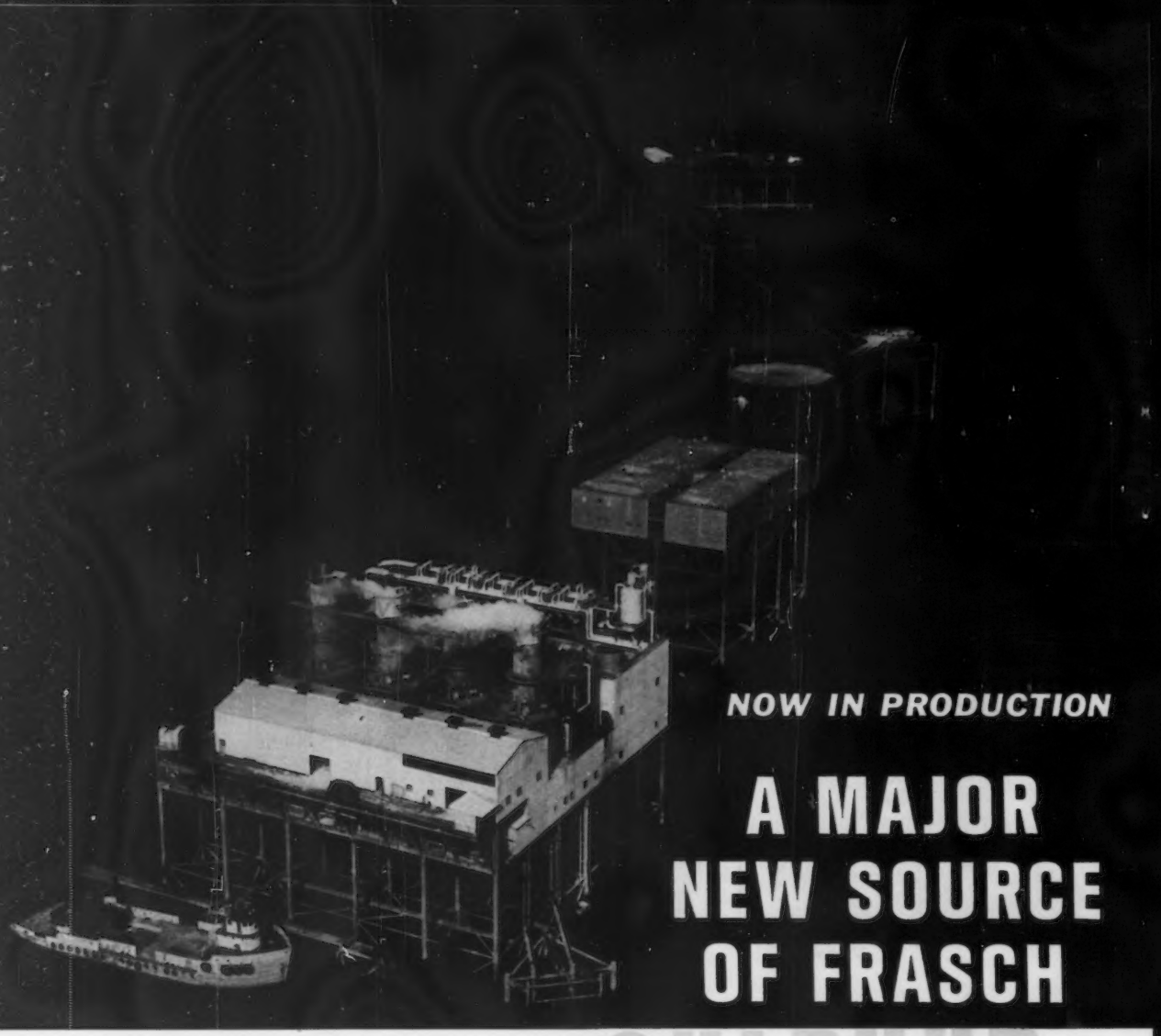

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REMEMBER THESE DATES

January 24-27, Technical Section, CPPA Annual Meeting, Queen Elizabeth Hotel, Montreal, Canada

February 20-23, Paper Week in New York

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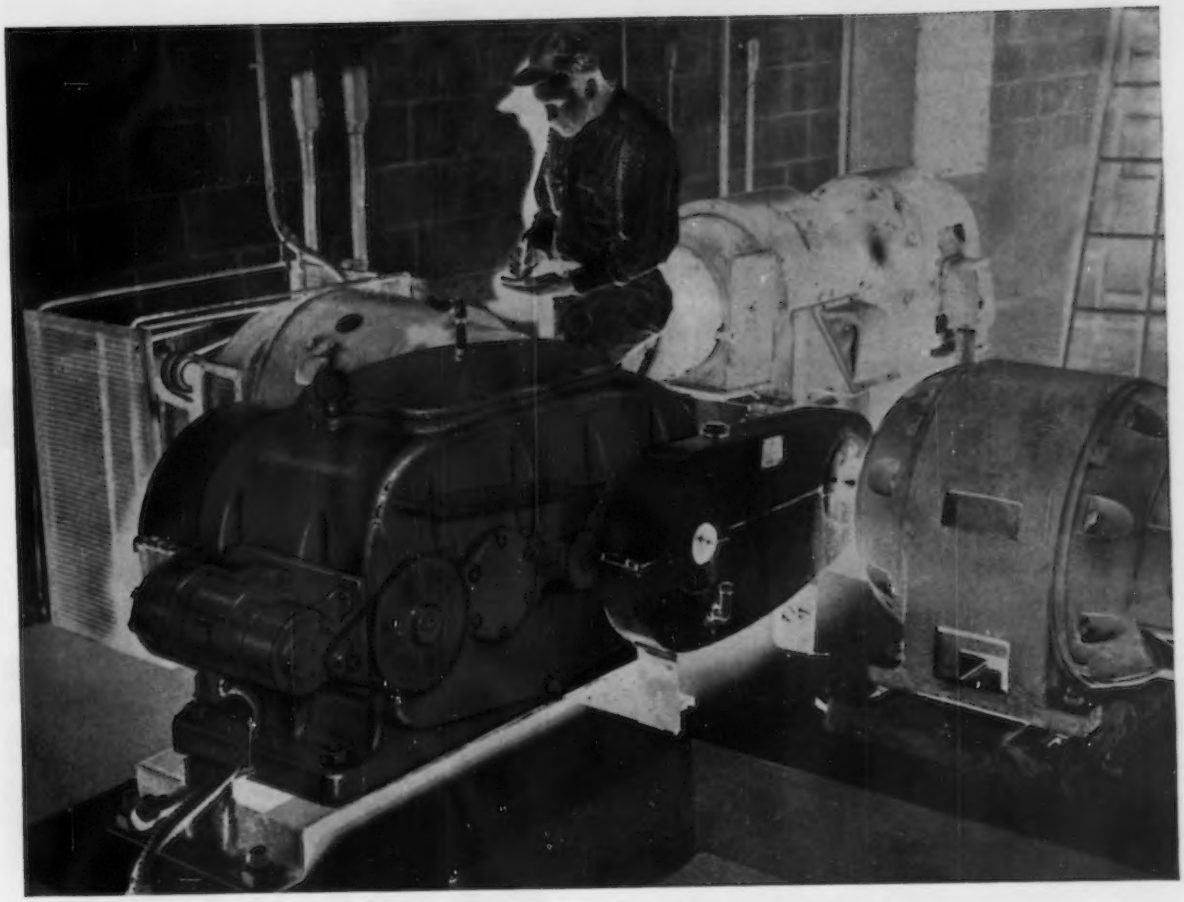

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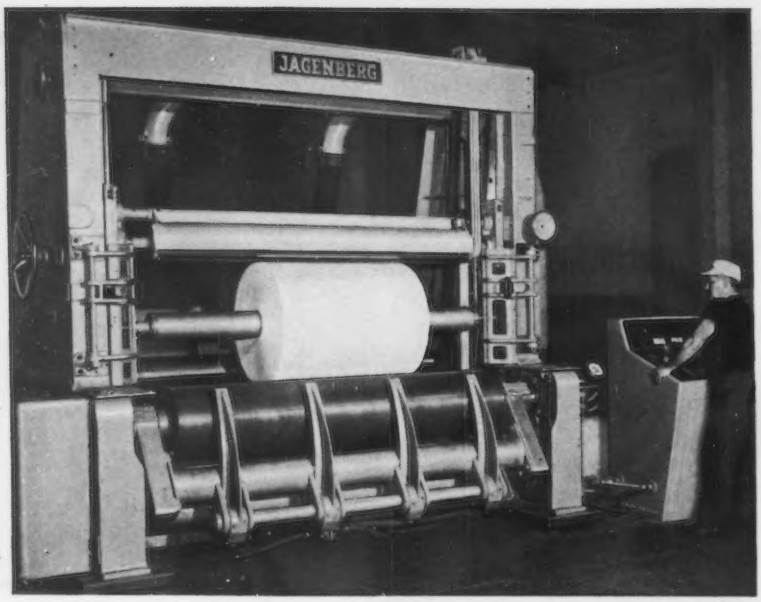
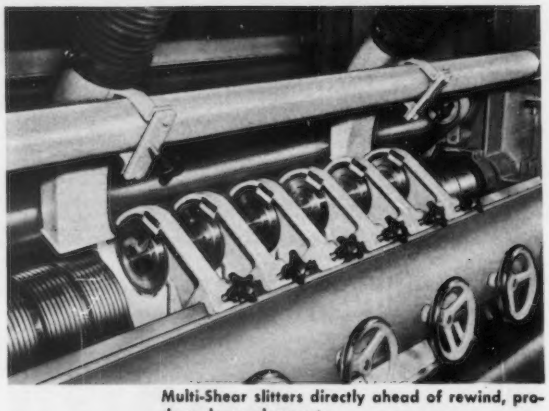


Model 30 operating at Westvaco's Tyrone Mill, rewinding and slitting narrow rolls.

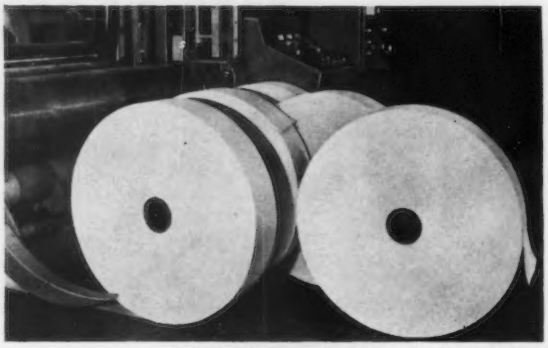
why WESTVACO bought the JAGENBERG Pneumatic Winder...

J. Lynne Ferner, Manager of the Tyrone-Williamsburg Division says: "Our mill at Tyrone, Pa., is in the fine papers business and we're constantly on the alert for new equipment and processes which will contribute to greater operating efficiency and improved quality. We installed a Jagenberg pneumatic winder at Tyrone after one of our engineers had had an opportunity to study its performance in commercial operation in Germany. The equipment is doing a good job of producing well-wound narrow rolls, principally for the envelope trade."



Multi-Shear slitters directly ahead of rewind, produce sharp, clean cuts.

JAGENBERG Available in three different Models, 60" to 160" wide, the JAGENBERG Pneumatic Winder can be installed behind the Paper Machine or off the Machine. Its special features include the "Multi-Shear" slitting system, a unique type of rewind shaft guide, driven fly rolls and a built-in roll lowering device. Pneumatic operation throughout. Speeds up to 4,000 fpm. Precision engineered by JAGENBERG, world's largest manufacturers of paper finishing equipment. Contact our representatives for full details.



Finished rolls separate easily, have clean straight sides.

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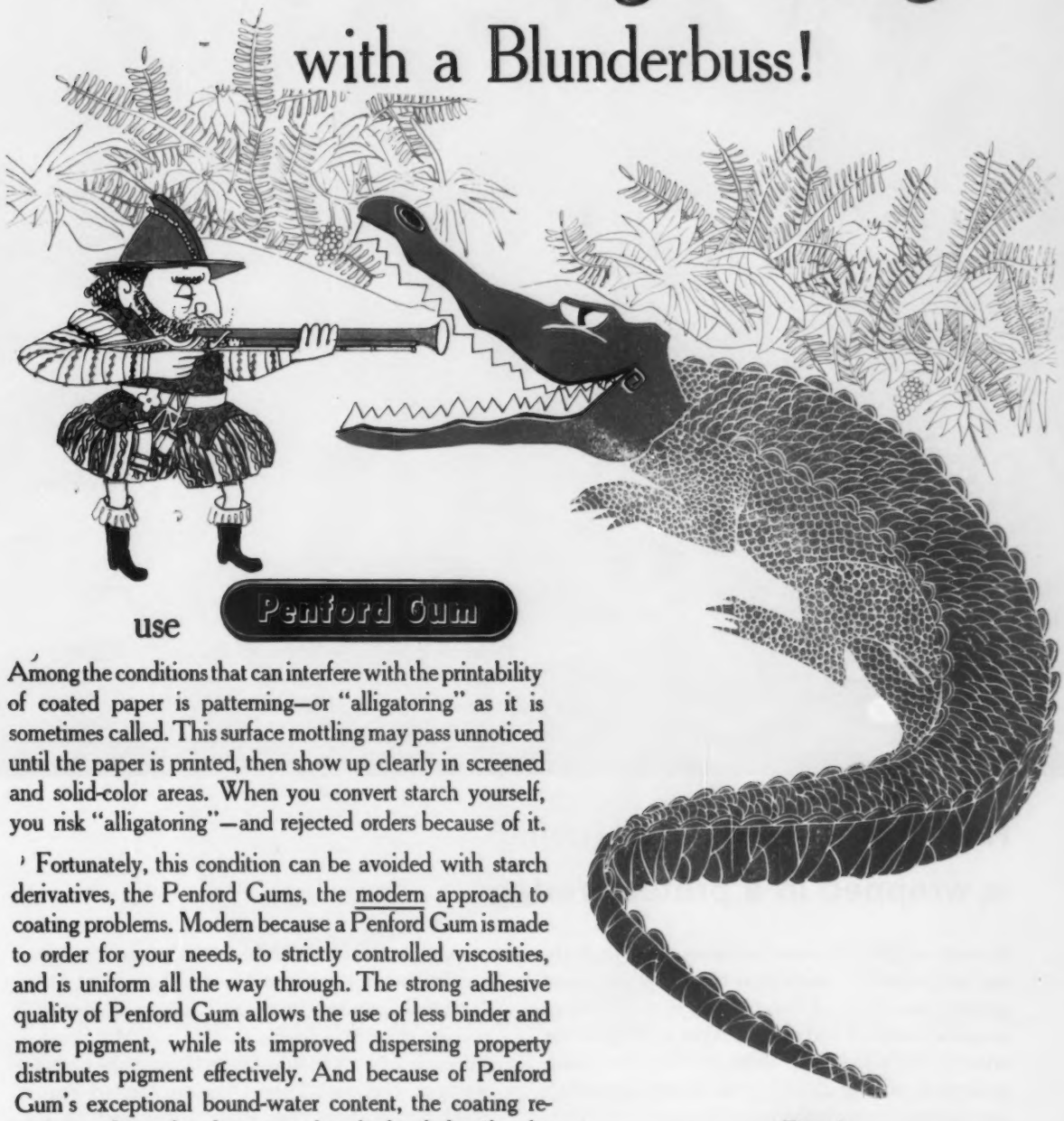
Don't Tackle "Alligatoring" with a Blunderbuss!



use **Penford Gum**

Among the conditions that can interfere with the printability of coated paper is patterning—or "alligatoring" as it is sometimes called. This surface mottling may pass unnoticed until the paper is printed, then show up clearly in screened and solid-color areas. When you convert starch yourself, you risk "alligatoring"—and rejected orders because of it.

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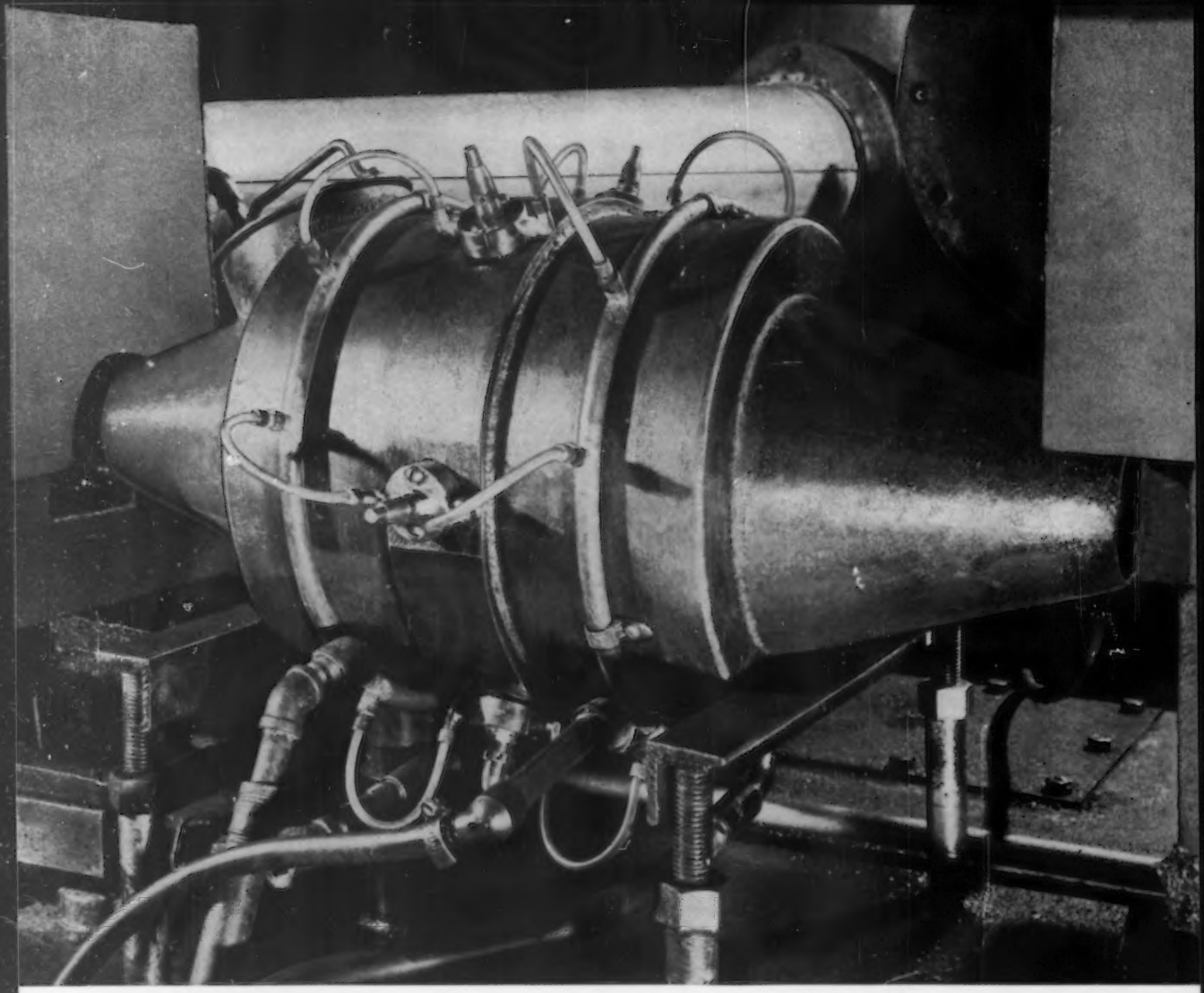

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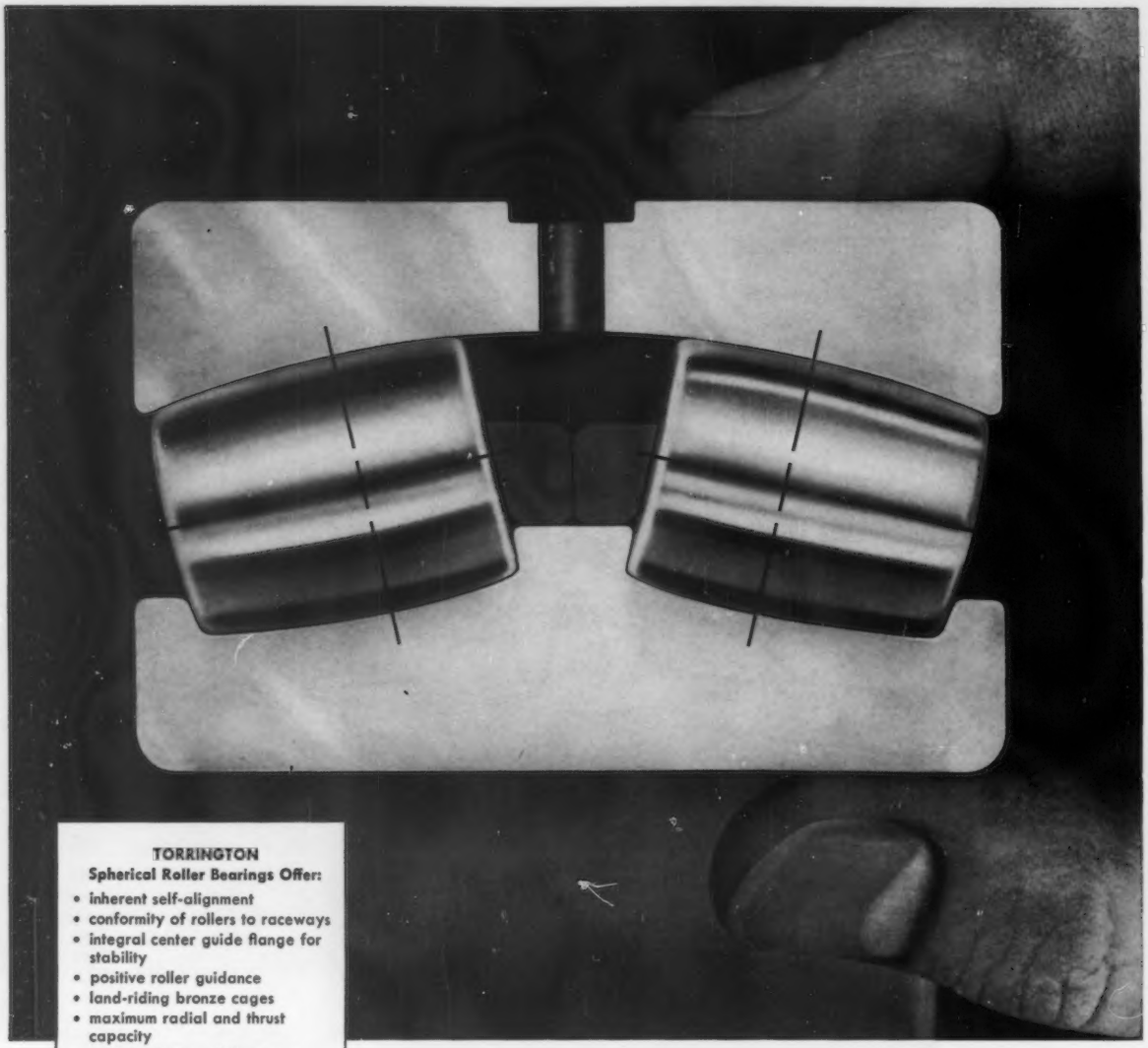

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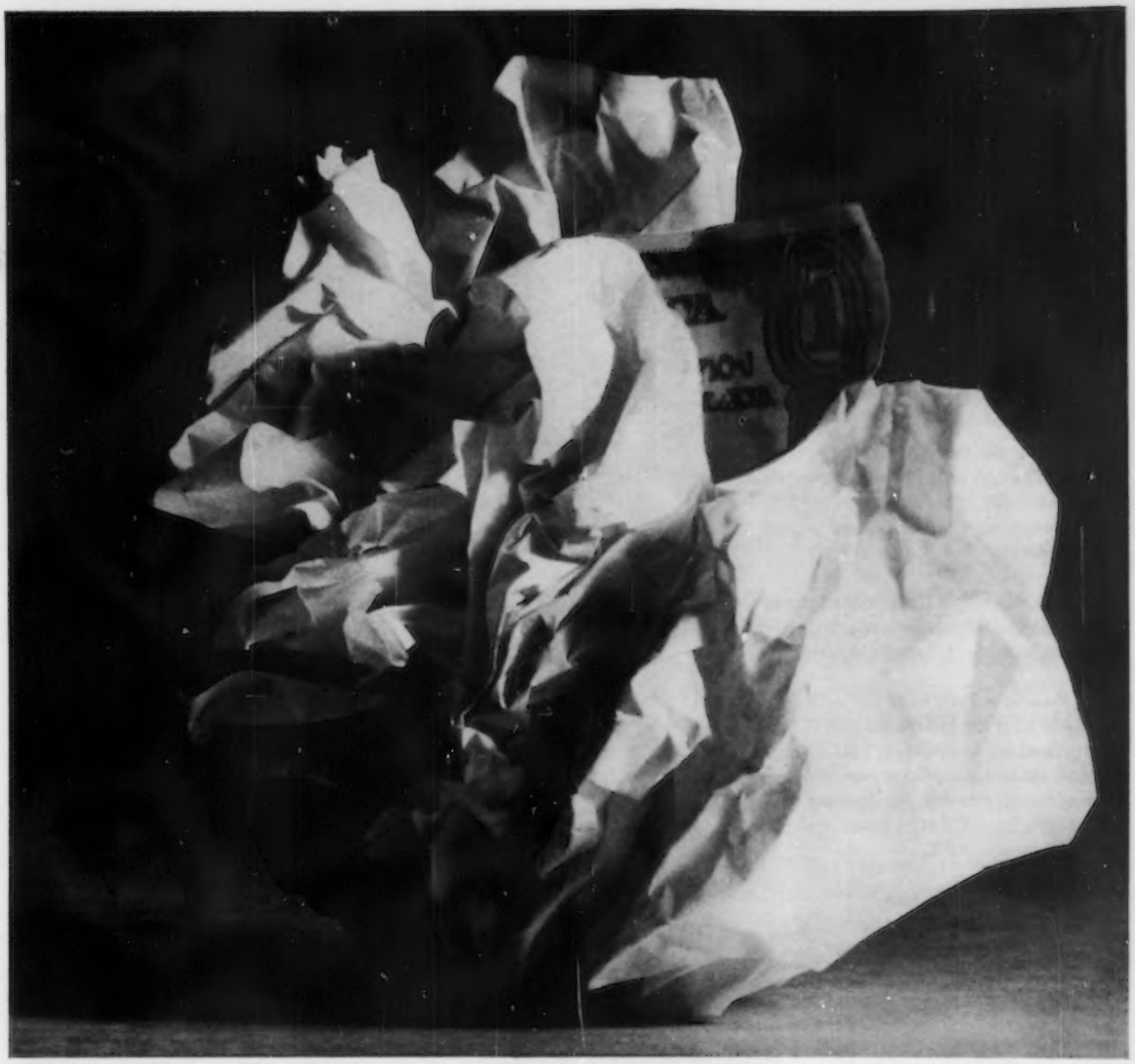

MORE THAN paper is thrown away when the efficiency of the size has not been fully realized. Time and money are also wasted. Don't let your mill face these losses. Consider Cyanamid's **high quality rosin sizes**—fortified and unfortified, liquid and dry—for dependable, cost-saving performance. And in back of Cyanamid's **high quality rosin sizes** are those all-important hidden ingredients... Cyanamid's extensive manufacturing and research facilities, and the skilled personnel who man them. Your Cyanamid salesman, with his technical training and paper-making knowledge, is truly your partner in paper progress. Ask him to give you complete information about Cyanamid's **high quality rosin sizes.**

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*Idea submitted by Harold E. Rowland, Continental Can Co. Inc., Hopewell, Va.
Photo by: Ewing Galloway, New York

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SHULER & BENNINGHOFEN, HAMILTON, OHIO

Courtesy of the Metropolitan Museum of Art

Too late...

for Huber clays to help this paper maker

This unknown Egyptian papyrus maker for the Pharaohs made "paper" of bullrushes found on the Nile River's banks. A cross-woven mat of reeds was wetted, pressed, dried and burnished smoother with shells. The result was paper—of a sort.

Upon such surfaces the Egyptians recorded their pictographic hieroglyphics. Thanks to the dry north African climate, the great Harris Papyrus—133 feet long and 16¾ inches wide—remained intact and survives in the British Museum. For the needs of those distant times, such papyrus was "good enough".

Papyrus would rate low on the modern papermaker's quality scale. But Huber filler and coating clays would improve it, if anything could. For these famous quality-controlled clays are used the world over to give many coarse grade pulp papers a quality printing surface, and to give better papers a superlative finish—at lower cost than other coating materials. Viscontrol — a patented Huber process, guards Huber coating clay uniformity.

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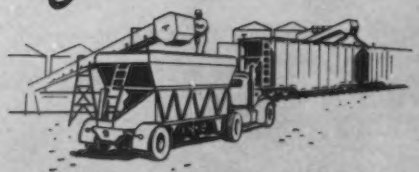

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- Continuous running ink rolls
- Overhead web transport with dynamically balanced guide rolls
- Turn-over arm flying splice unwind and rewind with positive infeed and outfeed tension controls
- New design for positive locking of both color and plate cylinders eliminates vibration, bounce — assures accurate adjustment for highest print quality

These Quality Features Available as Nominally Priced Extras: —

- Infeed and outfeed web edge controls
- 5th color unit with its own separate impression cylinder
- Latest design hot air dryer with high velocity jets between colors, in after tunnel, and chill roll following after tunnel
- Web conditioning and viewing equipment, slitters, etc.
- Separate motor driven tension control for rewinder

Putting Ideas to Work

FOOD MACHINERY AND CHEMICAL CORPORATION

FMC Packaging Machinery Division

Hudson-Sharp Machine Company

1201 MAIN STREET, GREEN BAY, WISCONSIN

make cleaner paper with NOPCO® DEFOAMERS backed by Nopco know-how

One of the causes of a bad run of paper can be foam. Bubbles that carry fiber, size or color on their surface burst and leave light spots. Those that carry filler or dye leave dark spots. Either way, the sheet won't pass inspection.

Many variables contribute to foam formation. Since each mill has its own distinct foaming problems—because of differences in equipment, type of water, chemicals used and running speeds—it takes a wide range of defoamers to meet them all. Let your Nopco specialist work with you to develop the best system for your conditions. Write for specific information and for literature.

NOPCO® **NOPCO CHEMICAL COMPANY**
60 Park Place, Newark, N.J.

Plants: Harrison, N.J. • Richmond, Calif. • Cedartown, Ga. • London, Canada • Mexico • France
Manufacturing Licensees Throughout the World

Best way to rack up sales...

IN BOTH COATED OR UNCOATED STOCK...USE CALCOFLUOR® WHITE!

Promise your customers brighter *printing* results...and *you're* bound to get better *sales* results! Cyanamid's Calcofluor White helps you get a brilliant, "whiter-than-white" base on uncoated AND coated stock. Add Calcofluor-whitened papers to your line and • **you pinpoint sales attention on all your white grades • you cash in on the trend to whitest whites • you clinch new sales to old customers, and make new ones** • Calcofluor White is today's bright "*eye*-dea" in paper sales. May we work with you soon?

CYANAMID

AMERICAN CYANAMID COMPANY • DYES DEPARTMENT • BOUND BROOK, N. J.

So Long . . . Until Tomorrow It took five flat cars to ship this 195 foot-long fractionating column from our Orange, Texas, plant. Even the Texans thought it was a whopper, but tomorrow we'll be fabricating bigger ones—that's the way it goes. ☐ This column went to a leading refinery where it produces high purity isobutane, a component of premium gasoline. ☐ The 12-foot diameter steel column is made up of 20 rings or sections, each ¾ of an inch thick. The rings are welded together, then welded to a 20-foot skirt which supports the tower in its upright position. After fabrication the column was stress relieved.

Our Orange, Texas plate shop can handle custom plate work of all kinds and sizes. We have experienced men and the right equipment, high capacity cranes, giant presses and bending rolls, the latest welding equipment, mammoth car bottom furnaces, and complete inspection facilities. We can ship by rail, truck or barge. And anything we make, we can erect. ☐ Write for our booklet on plate fabricating facilities and services.

USS is a registered trademark

This mark tells you a product is made of modern, dependable Steel.

General Offices: 525 William Penn Place, Pittsburgh, Pa.
Contracting Offices in: Ambridge • Atlanta • Baltimore • Birmingham Boston • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit Elmira • Gary • Harrisburg, Pa. • Houston • Los Angeles • Memphis Minneapolis • New York • Orange, Texas • Philadelphia • Pittsburgh Portland, Ore. • Roanoke • St. Louis • San Francisco • Trenton United States Steel Export Company, New York

American Bridge Division of United States Steel

USS

HOW BIG SHOULD AN AD SCHEDULE BE?

Open letter to suppliers who serve the paper and pulp industry

Suppliers who advertise in PAPER TRADE JOURNAL sometimes ask us how often their ads should appear. It's a little like being asked, "How high is up?"

Instead of telling advertisers how to schedule their ad dollars we'd like to point out something our editors have learned over the years—that readers want information week in and week out, 52 times a year. They want it enough to pay for it.

It's also a well-established fact that most readers don't care whether information comes from an article or an ad. So, readers want ads just as much as they want news or articles...as long as the ads are informative.

What does this suggest about ad schedules? The people you want to reach are reading PAPER TRADE JOURNAL every week; information about your kind of product is of special interest to some of them every week; to reach the maximum number of actively interested prospects your ads should appear—well, what do you think?

George E. Jefferson PUBLISHER

PAPER TRADE JOURNAL

P.S. Your fellow readers of PAPER TRADE JOURNAL are your customers and prospects.

Well, you could have
knocked me over with a feather . . .

NEWSPRINT UPGRADED TO THE QUALITY OF FINE PACKAGING AND PRINTING PAPER WITH AN ANATASE GRADE OF TITANIUM DIOXIDE!

It's a new Glidden product especially made for paper coating

GLIDDEN ZOPAQUE®
L.D.-C

SEE OTHER SIDE FOR MORE INFORMATION . . .

GLIDDEN ZOPAQUE® LD-C

SEE SAMPLE ON OTHER SIDE OF THIS NEWSPRINT PAGE...

an anatase grade of titanium dioxide made especially for the paper industry ...combining the best features of anatase and rutile grades for paper coating

NOW, the better brightness of anatase TiO_2 is combined with the ease of dispersion and low viscosity features of rutile grades... in Glidden ZOPAQUE *LD-C.*

LD-C has properties comparable to rutile. It is equally well suited for on and off machine, size press and calender coating. Compatible with all other common paper coating pigments and adhesives.

Being an anatase grade, new *LD-C* is for coating all nonwaxing plain and printed paper and board. And *LD-C* is priced as an anatase. Some users are obtaining savings of up to 2¢ per pound.

Higher machine speeds, heavier coating weights and other advantages are inherent in new *LD-C.* To get the full story, or samples, call your Glidden representative or our Baltimore headquarters.

QUALITY Glidden PRODUCTS

THE GLIDDEN COMPANY

FINEST PIGMENTS FOR INDUSTRY

Chemicals Division • Pigments and Color Department
Baltimore 26, Maryland

MANY GLIDDEN TECHNICAL FACILITIES ARE AT YOUR SERVICE for development or testing work in paper. Write for this new brochure—just off the press—*Paper Research and Development Laboratories.*

Gain **speed** without loss of quality with **Yankee Dryer Rolls**

Newport News manufactures Yankee Dryer Rolls to meet every requirement of high speed papermaking production.

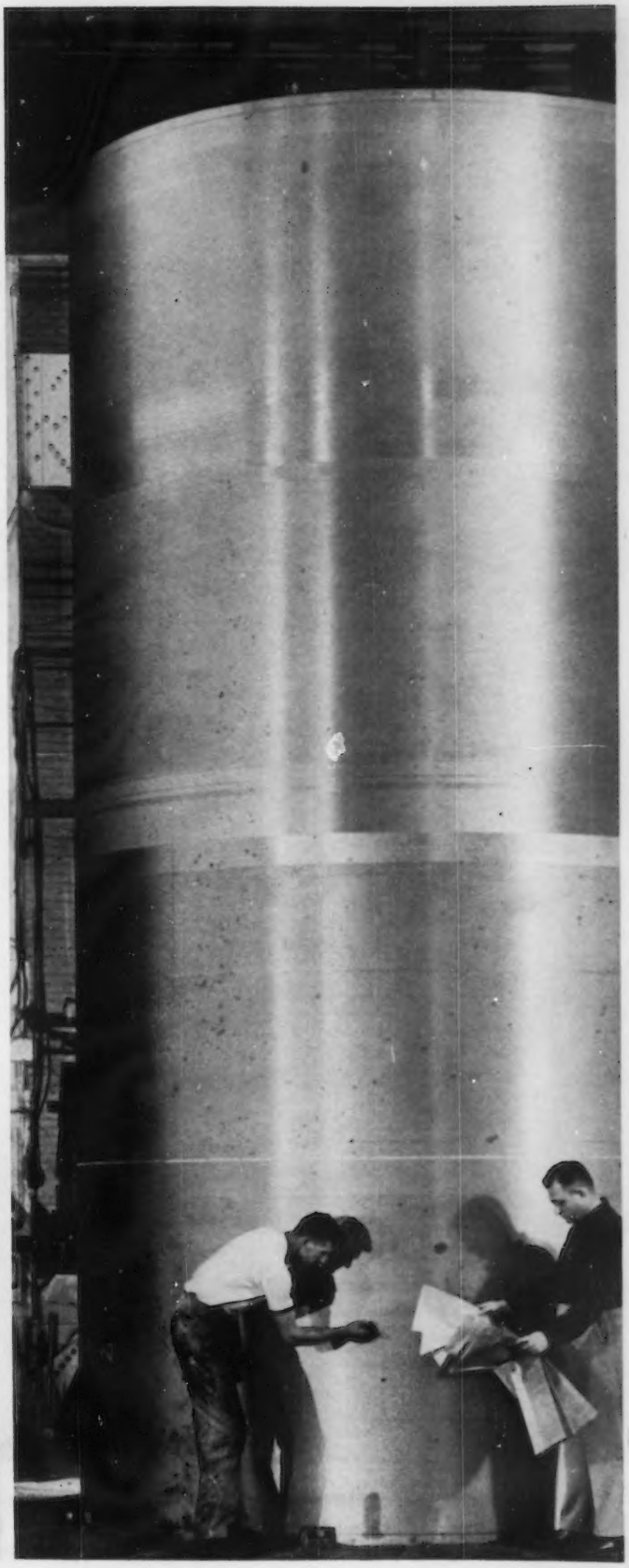
Every step in the manufacturing process undergoes the most painstaking quality control to assure delivery of steam-tight dryer rolls. Newport News can produce rolls up to 16 feet in diameter, up to 320" in length. Castings weighing up to 100,000 lbs. are machined to close tolerances and polished to any specified finish.

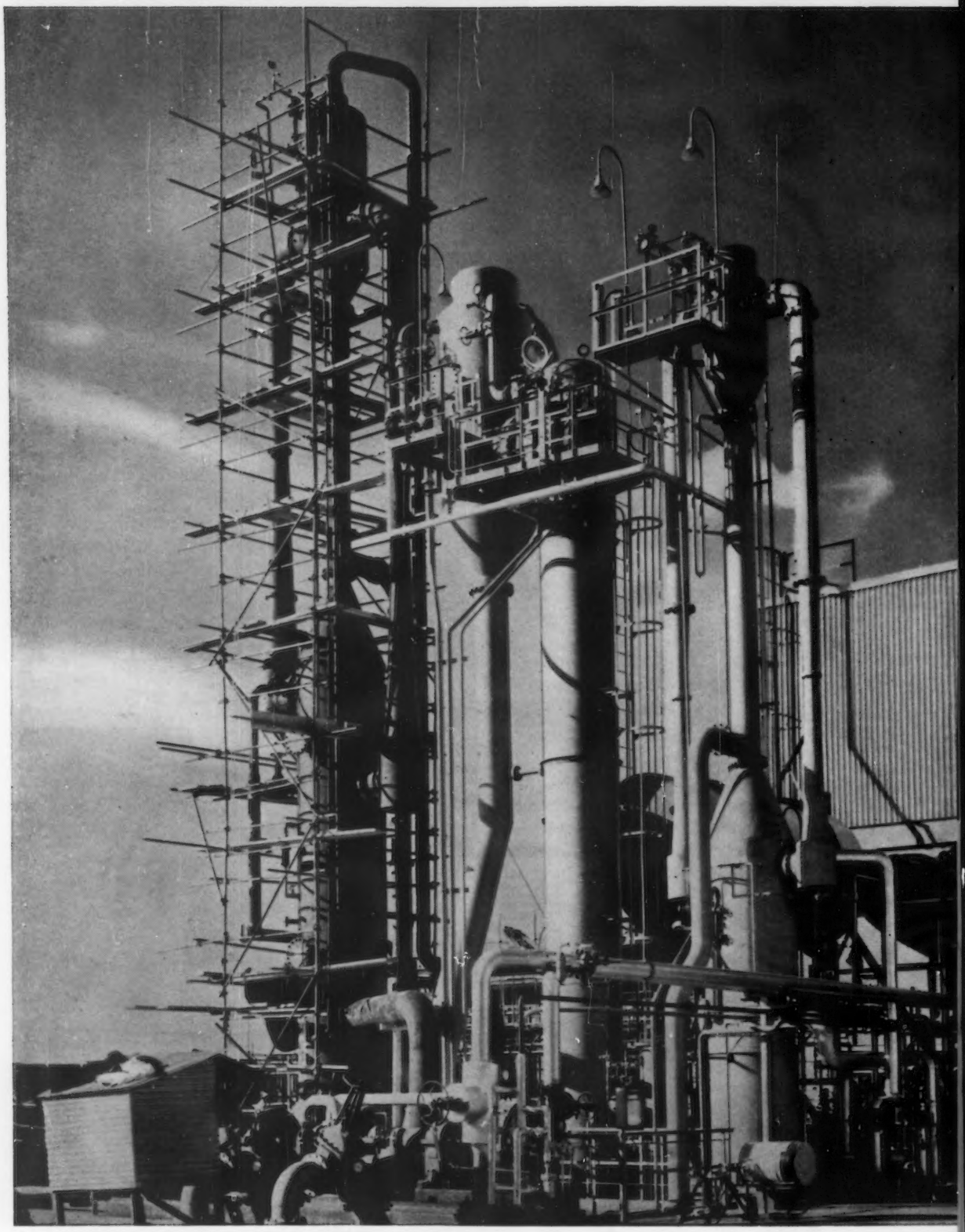
Capitalize on Newport News' tremendous productive capacity. In foundries, forge shops, machine shops and other facilities covering 225 acres, hundreds of skilled craftsmen complete orders with specialized techniques backed by 75 years of metal fabricating experience.

If you are considering new papermaking equipment, we welcome your inquiry.

REFLECTION OF QUALITY—The reflected image of the operator indicates the mirror-like finish of this 16-foot diameter drying roll.

Newport News
SHIPBUILDING AND DRY DOCK CO.
NEWPORT NEWS, VIRGINIA





PETROTHENE® RESINS FOR FILM AND COATING. Capacity of this U.S.I. plant at Houston, Tex., is being expanded to 200 million pounds of polyethylene per year. U.S.I. also produces 100 million pounds of polyethylene per year at its Tuscola, Ill., plant complex.

U.S.I.'s MANY PLANTS PROVIDE AMPLE SUPPLIES OF PAPER CHEMICALS

for pulping
for converting
for packaging

From chlorine and caustic for bleaching pulp—to polyethylene resins for coating paper and board—U.S.I. is a dependable source of chemical products for the paper industry.

With two chlorine and caustic plants at Huntsville, Alabama—conveniently located in relation to a large number of pulp and paper mills—U.S.I. can offer rapid delivery and prompt technical assistance on these products. Liquid chlorine is available in tankcars. Commercial grade 50% caustic soda is shipped in tankcars, tank trucks, barges.

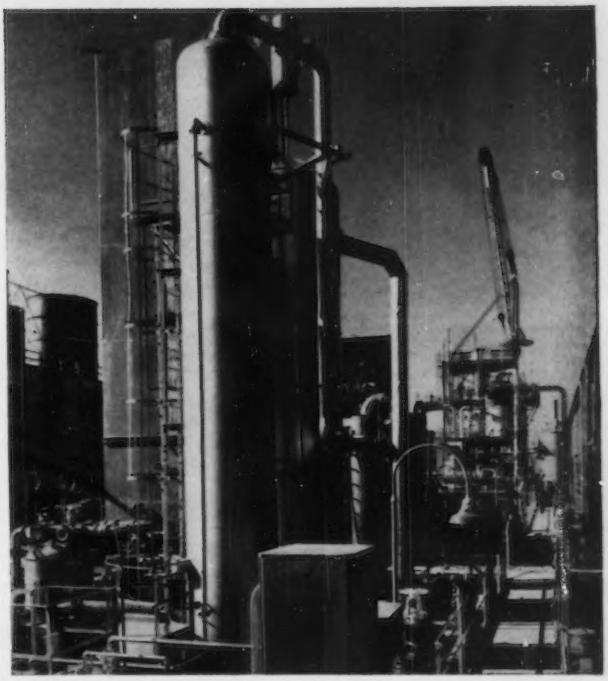
Two other important paper chemicals—sodium peroxide and ammonia—are also available from U.S.I. Sodium peroxide is produced at Ashtabula, Ohio; ammonia at Tuscola, Illinois.

With U.S.I.'s latest polyethylene resin plant expansion at Houston, Texas—and facilities at Tuscola, Illinois—the company's total polyethylene capacity will soon reach 300 million pounds per year. This will make U.S.I. the world's second largest producer.

As part of the company's program to assist polyethylene customers, U.S.I. has come up with significant developments in resins for the paper industry. For example, PETROTHENE® 205-15—one of four new U.S.I. resins for paper coating—exhibits greater greaseproofness at any given coating weight than other resins of similar melt index and density. All four resins are tailored for high adhesion, and reduced neck-in, smoking and polymer build-up at the die.

U.S.I. has also pioneered the new technique for producing crystal-clear cast polyethylene film, and has just released new resins for this purpose. More and more converters are packaging with polyethylene now that the clarity problem has been solved, because of the enhanced shelf life which this film gives to paper products.

U.S.I. has a pulp-to-package interest in the paper industry's growth. To take advantage of our research and development work, large capacity, prompt technical service, write or call your nearest U.S.I. sales office, or company headquarters in New York.



AMMONIA is made at this U.S.I. plant at Tuscola, Ill. Polyethylene resins are also produced at Tuscola by U.S.I.

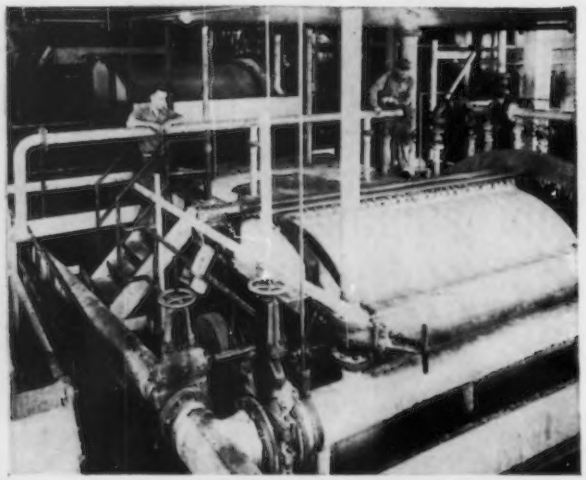
CHLORINE & CAUSTIC SODA. One of the two U.S.I. plants at Huntsville, Ala., producing these basic chemicals for the pulp and paper industry.

U.S.I. INDUSTRIAL CHEMICALS CO.
Division of National Distillers and Chemical Corp.
99 Park Ave., New York 16, N. Y.
Branches in Principal Cities

CHLORINE • CAUSTIC SODA • SODIUM PEROXIDE • AMMONIA • PETROTHENE® POLYETHYLENE RESINS

MODERN CLEANING SYSTEMS FOR MODERN PAPER MAKING

Connect to permanent pipe line



Circulate solution

Spray felts . . . job's done

Board mill slashes maintenance downtime with Oakite "Automated" Cleaning

Ever since it was installed, automated cleaning has been saving time and money at one Midwest board mill. *Unscheduled* cleaning downtime has stopped. *Planned* monthly clean-up is finished in a few hours.

Savings occur everywhere—suction press rolls are unclogged and spanking clean in less than a third of former time—felt is washed without downtime, *while it's still at work!*

How they did it. The Oakite man was asked to engineer a cleaning system for the entire paper making operation. He recommended permanent installation of detergent solution tank, manifold pipeline with couplings at each cleaning point . . . shower heads over felts and cylinders.

Hooked up fast. When machine stops, tanks are drained and loose pulp hosed down. The pipeline is coupled to cleaning points with sets of hoses; one supplies the shower heads, one returns drainage to tank. The Oakite solution circulates 1 to 2 hours . . . softening, loosening, floating dirt free. No more scraping or scrubbing . . . no work at all except inspection.

Felts are cleaned as needed, *while in operation.* Pushing a button sprays a detergent shower that's automatically rinsed off in 15 seconds.

How you can do it. Ask the Oakite man in your area to tell you more about the savings provided by Oakite engineered cleaning programs. Or, send for bulletin F4647. Oakite Products, Inc., 68 Rector Street, New York 6, N. Y.

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS · METHODS · SERVICE
SCIENCE

In our 52nd year.

Modern Cleaning Systems Keep Downtime DOWN

Export Division Cable Address: Oakite
Technical Service Representatives in Principal Cities of U. S. and Canada

POWELL

WORLD'S LARGEST FAMILY OF

VALVES

performance makes the world of difference

Powell Valves for Chemical and Process Industries

To meet the demand for new and different valves to control the flow of the constantly increasing number of corrosive fluids, Powell now has valves available in the largest selection of pure metals and alloys—aluminum, stainless steel, pure nickel, monel metal, hastelloy alloys, acid bronzes and many, many others.

All kinds are available—gate, globe, angle, check, "Y", relief, flush bottom tank valves, etc. They are scientifically designed and ruggedly built for top performance when used in the service for which they are recommended. Either consult your nearby Powell Valve distributor—or write to us for illustrated literature.

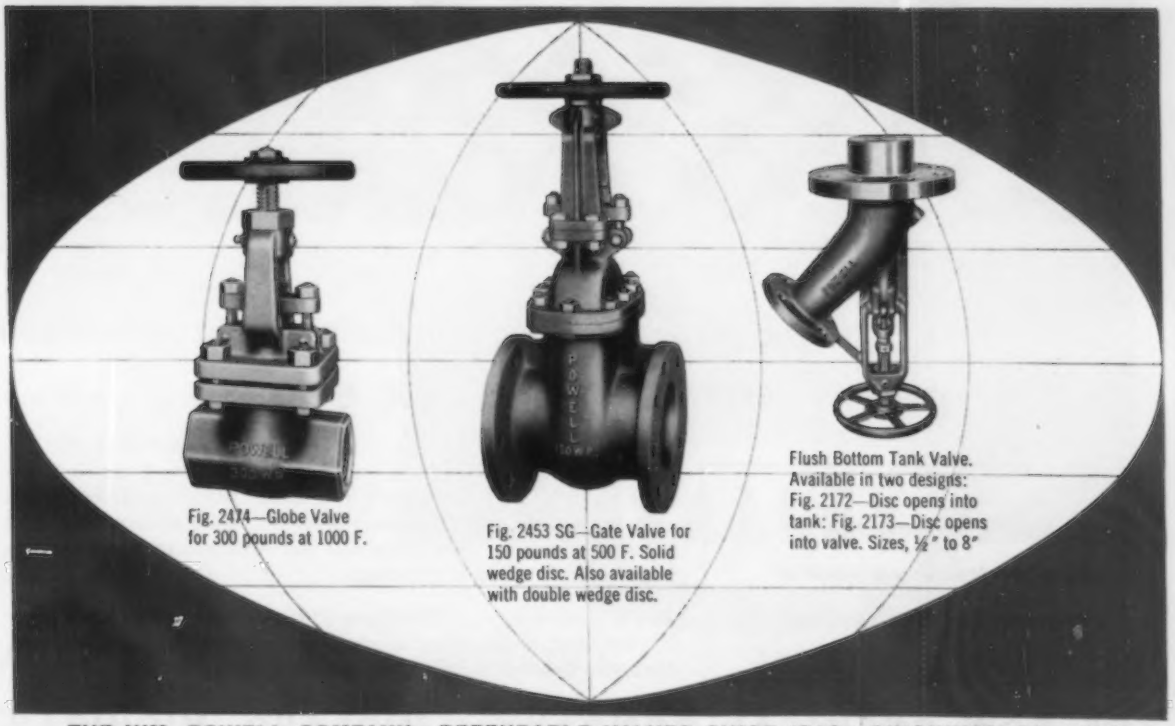


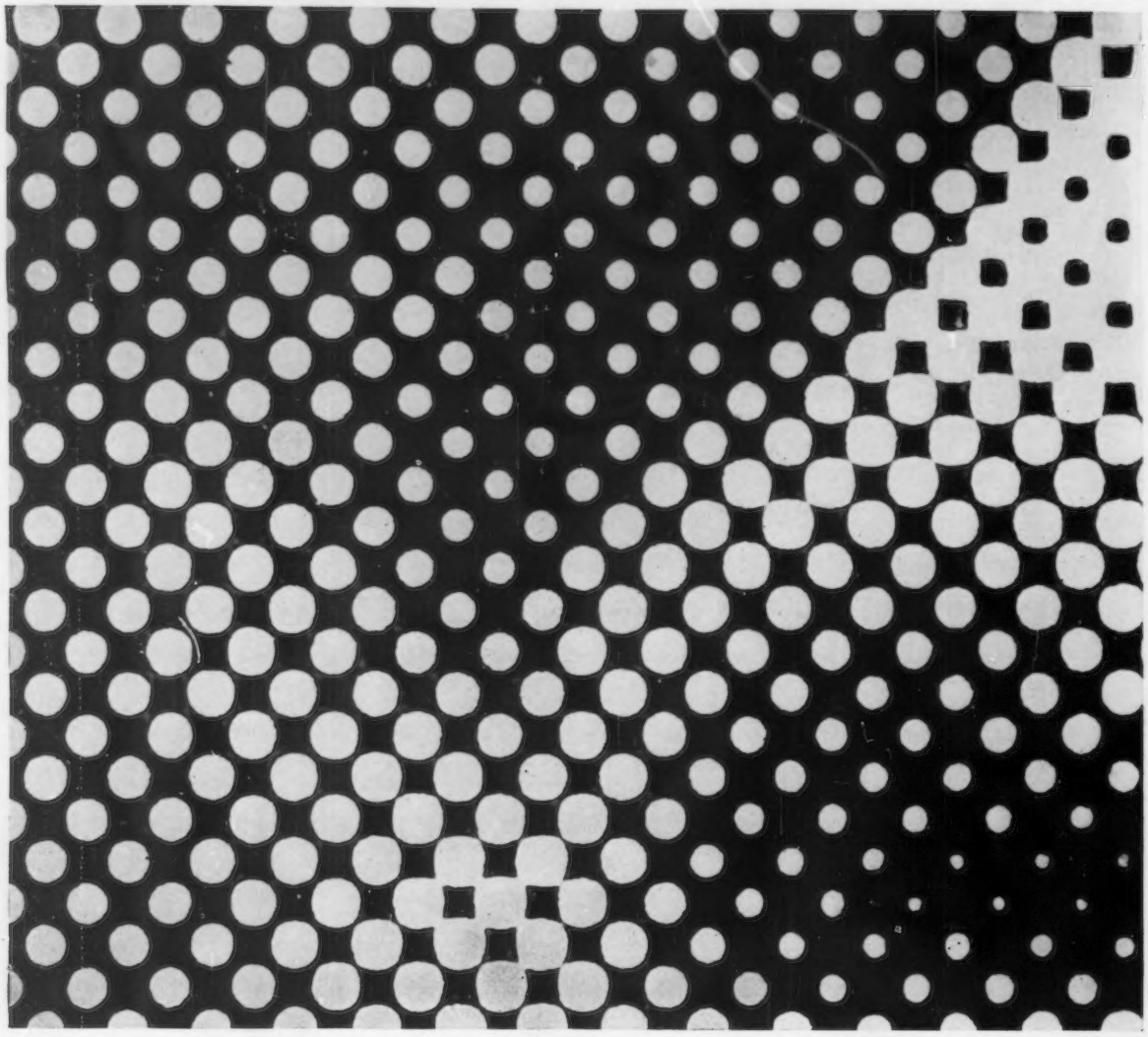
Fig. 2474—Globe Valve for 300 pounds at 1000 F.

Fig. 2453 SG—Gate Valve for 150 pounds at 500 F. Solid wedge disc. Also available with double wedge disc.

Flush Bottom Tank Valve. Available in two designs: Fig. 2172—Disc opens into tank: Fig. 2173—Disc opens into valve. Sizes, ½" to 8"

THE WM. POWELL COMPANY • DEPENDABLE VALVES SINCE 1846 • CINCINNATI 22, OHIO

DOW | LATEX



120-line screen letterpress impression magnified 23 times shows the sharp, clean printing that results from the smooth surface achieved with new Dow Latex 630.

Now... better paper surface... better printing...
with **NEW DOW LATEX 630**

- **Superior Pick Resistance!**
- **Excellent Mechanical Stability!**
- **Excellent Starch Compatibility!**

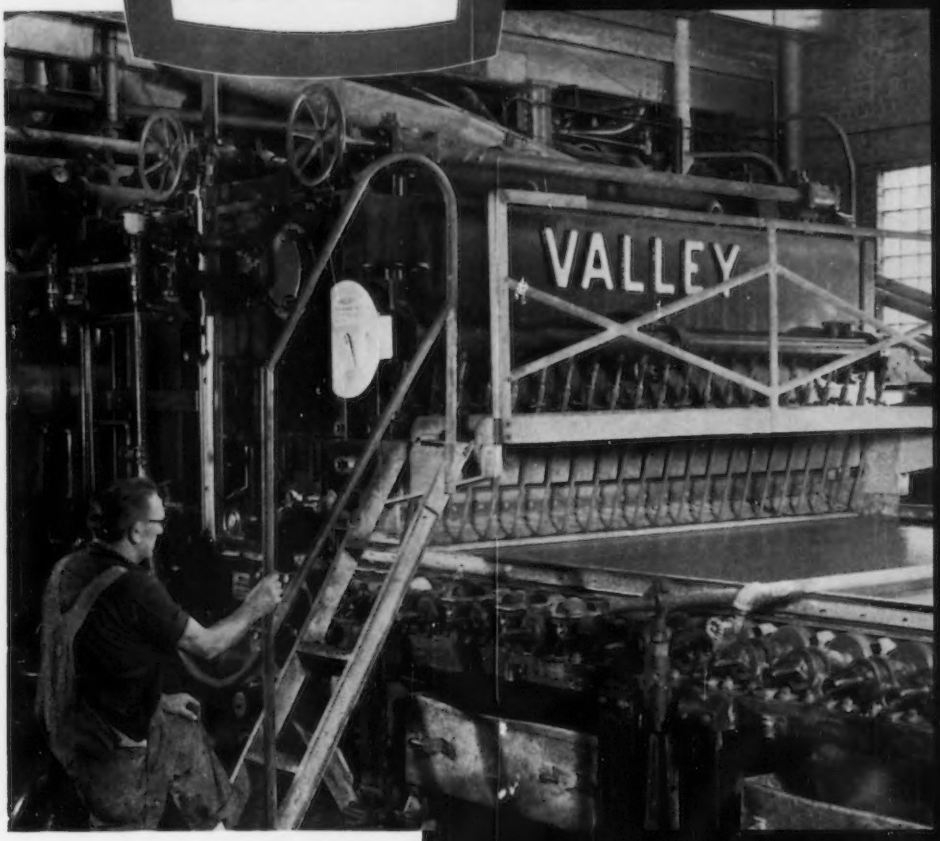
With NEW DOW LATEX 630 in your coatings, your paper can set a new high standard for printability. Clear, sharp, true-to-life reproductions . . . because the paper surface is smoother, more uniform and more resistant to picking. Dow Latex 630 was developed to give you every manufacturing and sales advantage.

Dow is ready to help put Dow Latex 630 to work for you on better paper . . . for better profits. Write to THE DOW CHEMICAL COMPANY, Midland, Michigan, Coatings Sales Department 1935DP12-12.

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

another new INLET and HEADBOX

by . . . VALLEY



No. 10 machine THILMANY PULP and PAPER CO.

Kaukauna, Wisconsin

Since this unit was installed in 1959, two additional units have been purchased for Thilmany's Machines.

write . . . VALLEY

VALLEY IRON WORKS CORPORATION • APPLETON, WISCONSIN

Subsidiary of Allis-Chalmers Mfg. Co.

West Coast Representative: E. A. Berry, P. O. Box 958, Longview, Washington

Canadian Representative: Pulp and Paper Mill Association Ltd., P. O. Box 850, Station "O", Montreal 9, Quebec

the largest group of research and development people

...devoted to improving the performance of rolls used by the Paper Industry.

EXAMPLES:

DENSITE® roll covering which resists both heat and chemical attack and adds to the rigidity of light-weight cores.

Also developed by S-W: FABULITE®, GUARDITE® for rectifier rolls, PLASTILOY®, SEALSKIN® and PRESKOTE®.

STOWE-WOODWARD, INC.

Newton Upper Falls, Mass. *Neenah, Wisconsin* *Griffin, Georgia*

on the West Coast • HUNTINGTON RUBBER MILLS, INC. • Seattle, Washington • Portland, Oregon • Port Coquitlam, British Columbia, Canada

"How to Get Longer Life from a Rubber Covered Roll" — will be sent to you upon request.

Trends

Mill Rates Not Too Bad!

Paper mills ran about 91% of capacity in November and board mills near 88%, compared with November 1959's boom figures of 96% and 94% respectively. Hardly a serious decline yet.

Exports Continue at Record Level

Pulp and paper exports for the first nine months are running well ahead of the same period last year, as follows: pulp +79%, paper and board +11%, paper +1%, paperboard +25%. Only the following categories representing small quantities are down: wet machine board —21% and building board —8%.

Waste Papers off in December

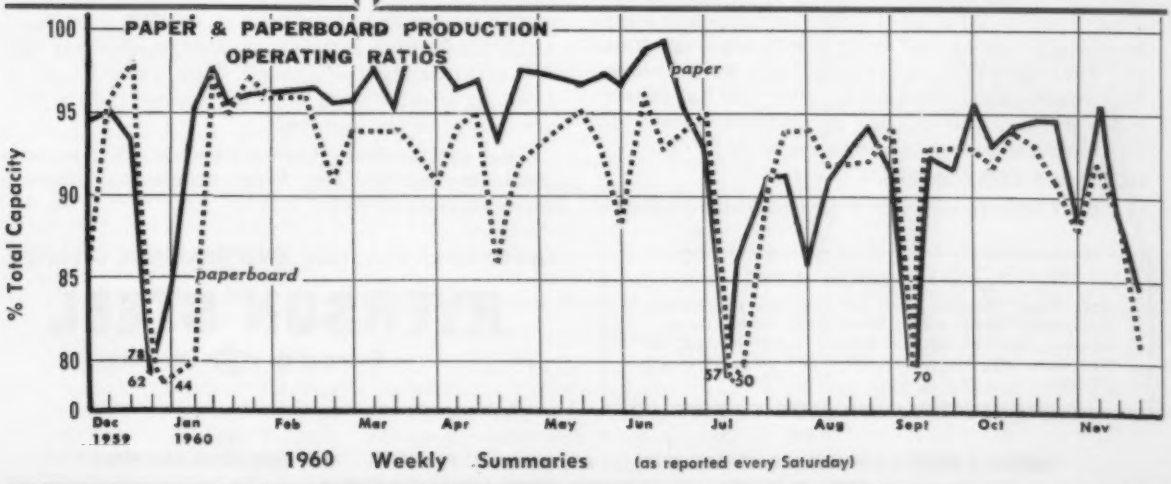
Waste paper prices continued to show further weakness in early December. Drops in many grades were reported for all major areas.

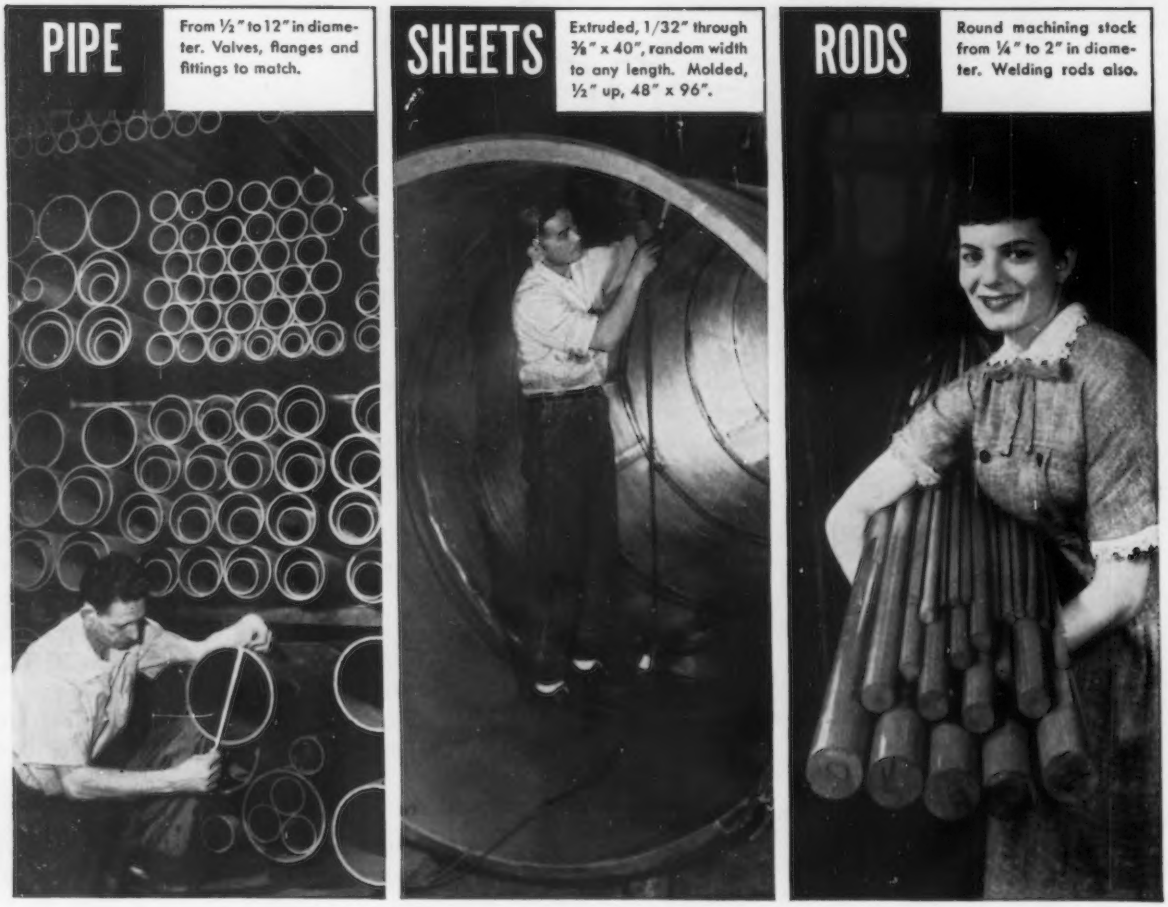
Merchant Sales Picture Mixed

Merchant sales of fine papers in October were off 1.4% from September and up 1.3% from October, 1959, according to NPTA. For ten months fine paper sales are 4.5% of same period last year. Merchant sales of wrapping paper in October were off 4.4% from September and 4.0% from October, 1959. For the year to date wrappings are ahead 0.7%.

Not Optimistic for Next Year

In 1961, paper and board capacity is expected to rise by about 4%, the Value Line Investment Survey predicts, while with the general economy likely to remain somewhat depressed, consumption probably will not come up to the industry's normal 3½% annual increase. Operating ratios and profits next year are not likely to show significant recovery. The paper industry, The Value Line Investment Survey believes, will show the necessary restraint in considering its expansion plans over the next few years, and looks for a better balance between demand and capacity 3 to 5 years hence. (Editor's Note: We hope so but . . .)




PIPE
From ½" to 12" in diameter. Valves, flanges and fittings to match.
SHEETS
Extruded, 1/32" through 3/8" x 40", random width to any length. Molded, ½" up, 48" x 96".
RODS
Round machining stock from ¼" to 2" in diameter. Welding rods also.

Three ways to stop corrosion

WITH TIME-TESTED RYERTEX-OMICRON PVC

Here's a versatile plastic that's lightweight (only one-sixth the weight of steel) . . . yet is tough and durable. Time-tested by 20 years of varied application, it resists weathering, rotting and aging indefinitely. It's Ryertex®-Omicron PVC—and available only from Ryerson. This nonmagnetic, nonsparking PVC will not support combustion . . . and in many applications is used successfully at operating temperatures up to 200°F.

LICKS 281 CORROSIVES

Lab tests have proved that this remarkable plastic resists 281 corrosive solutions and gases—including acids, alkalies, waste products, etc.

This unique PVC forms easily, cuts with a handsaw, welds readily with hot-air equipment, machines at high speeds on standard equipment. Pipe can be joined by brushing on solvent and applying fitting—and the joint is as strong as the pipe itself.

Find out whether Ryertex-Omicron PVC answers your corrosion problems. Write your nearby Ryerson plant for Bulletin 80-3.

Typical applications of PVC

Pulp lines, chlorine lines, chlorine gas distributors, white-water tanks, sizing tanks, head boxes, troughs, blowers, flow boxes and baffles, beater linings, fan housings, bars and girths, trays and pulp measuring devices.

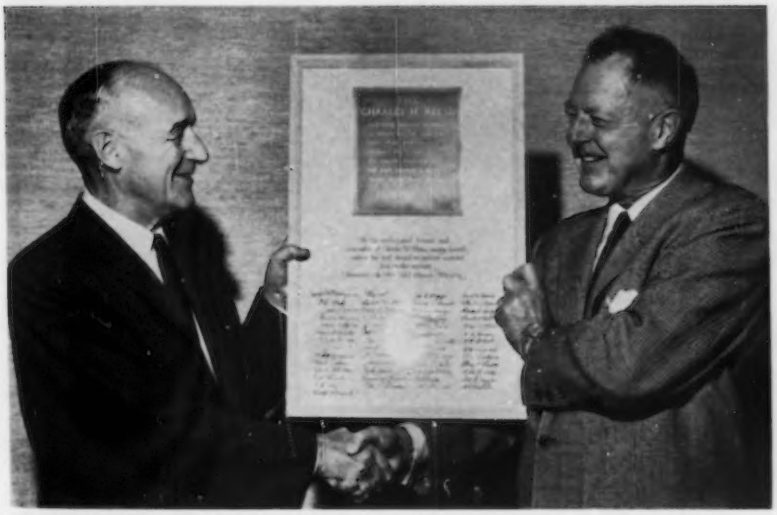
INDUSTRIAL PLASTICS AND BEARINGS DIVISION

RYERSON STEEL®

Member of the INLAND® Steel Family

NATION'S MOST COMPLETE SERVICE ON STEEL . . . ALUMINUM . . . PLASTICS . . . METALWORKING MACHINERY
SERVICE CENTERS IN PRINCIPAL CITIES COAST TO COAST

PJT PAPER TRADE JOURNAL
WEEK OF DECEMBER 12, 1960



TESTIMONIAL SCROLL is presented to Charles Reese, manufacturing vice president, by John Alexander, president, Nekoosa-Edwards Paper Co.

Nekoosa-Edwards Names New Machine The Charles H. Reese

Nekoosa-Edwards has named its big, new paper machine The Charles H. Reese, honoring the company's vice president in charge of manufacturing. Members of the board of directors and some 50 department managers recently attended a testimonial dinner to pay tribute to Mr. Reese who has headed the company's manufacturing operations for 25 years.

Presiding at the dinner meeting was President John E. Alexander who traced Mr. Reese's career in the paper industry and presented him with a parchment scroll bearing the signatures of Nekoosa-Edwards associates who were in attendance. A cast bronze plaque was unveiled at the meeting which will be mounted adjacent to the new machine. It bears this inscription:

"The Charles H. Reese. This machine is named in honor of the man who, more than any other individual, was responsible for the quality tradition which has made Nekoosa a leader in the paper industry."

Mr. Reese came to Nekoosa-Edwards in 1935 after 21 years with Hammermill Paper Co., Erie, Pa. Under his leadership, the company entered the fine paper field. This move required a sweeping revision of production equipment and manpower skills, because the company had previously been a manufacturer of newsprint and wrapping papers.

Today, Mr. Alexander told the group, Nekoosa-Edwards is established as a national leader in the production of writing, business, and printing papers. "Much of the credit for this success must go to Charles Reese," he said.

Triquet Paper Purchases Weissinger Paper Assets

The Triquet Paper Co. purchased the assets of the Weissinger Paper Co. and started operations as a wholesale paper merchant November 17. Officers of the new company are V. A. Triquet, president and general manager; Robert O. Bruegel, vice president; and Joseph T. Marks, secretary and treasurer.

The Triquet Paper Co. will serve the same sales area and paper mills as the Weissinger Co., Mr. Triquet said. These include Howard Paper Mills, S. D. Warren Co., Northwest Paper Co., Consolidated Water Power & Paper Co., Neenah Paper Co., Linweave, Sorg Paper Co., and French Paper Co.

"We will confine our activities, principally to the sales of printing and industrial papers, concentrating mainly on printing papers," Mr. Triquet said.

The Weissinger Paper Co. was founded in 1929 by the late F. J. Weissinger. Mr. Triquet joined the company in 1934 as sales manager. In 1942, he was made assistant general manager. After the death of Mr. Weissinger in 1950, Mr. Triquet was appointed president and general manager.

Mr. Bruegel joined the company in 1939 as sales representative. Mr. Marks joined the company in 1952 and was purchasing agent at the time of changeover.

Paper and Paperboard Production

The American Paper and Pulp Association reported the ratio of the United States paper production to mill capacity for the holiday week ending November 26, 1960, at 84.4 per cent, compared with 90.1 per cent, revised, for the preceding week. The ratio was 93.8 per cent for the corresponding week a year ago.

The National Paperboard Association reported the paperboard production ratio for the week ending November 26, 1960, at 81 per cent, compared with 89 per cent for the preceding week and 91 per cent for the corresponding week a year ago.

(Detailed Statistics on page 70)

PAPER PEOPLE

Five Brown Executives Named Vice Presidents

Five Brown Co. executives were elected vice presidents by the board of directors on November 30. The action followed consolidation of the company's operations into divisionalized form at the close of the company's fiscal year.

Hugh D. Jordan, who became treasurer of Brown Co. last July, was elected vice president and treasurer.

H. A. Raymond, Jr., formerly president of Resi-Chem Corp., a wholly owned subsidiary of Brown, has been made vice president and general manager of the Resi-Chem Division. Mr. Raymond will continue to direct production and sales of synthetic resin and adhesive products.

Allie E. Salls, who has been president of Brown's subsidiary corporations engaged in the manufacture of hardwood veneer and plywood, was elected vice president and general manager of the Plywood Products Division.

Conrad T. Waldie, Jr., who has been in charge of Brown's towel division, was elected vice president and general manager of the Towel, Tissue and Onco Divisions.

J. J. McDonald, general manager of the sulphite pulp and floc division, was made vice president and general manager of this part of the company's operations. Mr. McDonald will continue to direct production and sales of this line of Brown's products.

Consolidated WP&P Names Biron Div. Production Mgr.

H. M. Hughson has been appointed to the new position of production manager of pulp and paper at the Biron Division of Consolidated Water Power & Paper Co.

Mr. Hughson has been heading Biron Division's Technical Department since 1959. He joined the company in 1958 after nearly 12 years' experience in the paper industry and holds a master's degree in chemical engineering from the University of Toronto.

P. R. Leake

Albemarle Names Leake Manager Chemical Research

Preston R. Leake has recently joined the Technical Division of Albemarle Paper Manufacturing Co., Richmond, Virginia, as manager of chemical research. Dr. Leake is a graduate of the University of Virginia and received his M.A. and Ph.D. degrees in organic chemistry from Duke University in 1953 and 1954 respectively. He was employed by the Nitrogen Division of Allied Chemical Corp. in Hopewell, Virginia, for six years as senior research supervisor.

Also Ronald B. Estridge has recently joined the Technical Division as senior development engineer. He is a graduate of North Carolina State College where he received the Scholastic Achievement Award of the American Institute of Chemical Engineers. He received his M.S. and Ph.D degrees recently at the Institute of Paper Chemistry, Appleton, Wisconsin. He also received the Paper and Twine Association Award while there.

Union Bag-Camp Bag Div. Announces Exec. Changes

A number of executive changes in its bag division have been announced by Union Bag-Camp Paper Corp.

Harry Recher, former director of flexible packaging sales, was named manager of bag sales.

William Mellick, former director of chain store sales, was appointed director of flexible packaging sales.

Frank Little continues as director of standard products sales and has been given the additional responsibility of supervising chain store sales.

Both Messrs. Mellick and Little, as well as J. J. Patterson, Jr., who continues as director of multiwall bag sales, will report to Mr. Recher.

Bowaters Names Wilkerson To New Post

James A. Wilkerson, industrial relations supervisor at Bowaters Southern Paper Corp., has been promoted to assistant personnel manager, John T. Skipper, industrial relations manager, announced.

Mr. Wilkerson, a resident of Athens, Tenn., joined Bowaters Southern in December, 1955, as woods personnel representative. He has since filled the positions of employment supervisor and safety supervisor at Bowaters Southern and served as assistant industrial relations superintendent at Bowaters Carolina Corp., Catawba, S. C.

Mead Board Sales Realigns Executive Responsibilities

R. J. Blum, president of Mead Board Sales, Inc., has announced that changes have been made in certain responsibilities in the executive structure of this wholly owned subsidiary of The Mead Corp.

Harry J. Blum, executive vice president of Mead Board Sales, will be responsible for the coordinating sales and scheduling at Mead's nine kraft liner and corrugating medium mills. Fred G. Robertson of Newark, N.J., has been appointed general sales manager for all domestic and foreign sales offices for Mead Board Sales, and Edward R. Harris of Lynchburg, Va., will head market planning.

H. J. Blum started with Mead Board Sales as a salesman in 1946, and in three years was elected a director of the company. In 1951, he was elected vice president and became executive vice president in 1959.

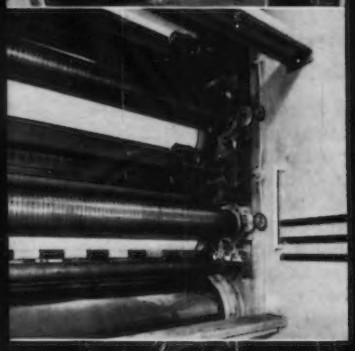
F. G. Robertson, native of Lyerly, Ga., joined Mead Board Sales at Cincinnati in 1946. Subsequently, he was named sales manager at Newark, N.J., in 1950, assistant vice president in 1954, and was elected to a vice presidency in 1956.

Edward R. Harris, vice president

Vickery
RS Type Doctors

Vickery
Hi-Angle Doctors

Vickery
Hi-Flex Doctors



Vickery
Oscillating
Doctors

Vickery Doctor
Air Lift Control

Back of every VICKERY DOCTOR installation are unequalled resources of doctor engineering and application experience

BIRD MACHINE COMPANY,
South Walpole, Mass.
Regional Offices: ATLANTA 9, GEORGIA
EVANSTON, ILLINOIS • PORTLAND, OREGON
Canadian Manufacturers of Bird Machinery:
CANADIAN INGERSOLL-RAND COMPANY Ltd., Montreal

Product of PORT HURON
CCA
Join the parade of leading mills saving money with
JONES ADAPTA-PLUG
and
FULBAR FILLINGS

Patented
SL
SIMPSON PAPER COMPANY
Division of Simpson Lee Paper Company
CASCADE KRAFT
CORPORATION
Packaging Corporation of America
union camp
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COMPANY
Wausau papers
E. D. JONES CORP.
BELOIT
PITTSFIELD MASS
Jones
PULP MILL EQUIPMENT AND
STOCK PREPARATION MACHINERY

of Mead Board Sales since 1955, joined The Mead Corp. at Chillicothe, Ohio, in 1925. In 1929, he was transferred to New York where he was affiliated with white paper sales until 1931 and with paperboard sales from 1931 until 1938. Since July, 1938, Mr. Harris has been headquartered at Lynchburg, Va.

Riegel Paper Creates New Sales Position

The Specialty Products Division of Riegel Paper has created a new position of electrical paper specialist to provide better service for its customers in the electrical industry. Jerre W. Hoffman, formerly product supervisor in technical industrial sales, has been named to the new post and will report to B. M. Foose, Jr., sales manager, technical industrial sales.

Mr. Hoffman will be responsible for the sales and sales development of Riegel's highly technical products for the electrical market. He will handle key accounts and work with other Riegel sales personnel in the activities related to the electrical field.

Mr. Hoffman joined Riegel in 1952 as a chemist in the Milford, N. J., laboratory and subsequently worked in research and development. He became chief chemist in 1957. In 1958 he was transferred to the New York office as a sales engineer. He is a graduate of Lafayette College with a B.S. in chemical engineering.

Gilman Fills New Post of Manager, Trade Relations

Gilman Paper Co., manufacturer and converter with plants at St. Marys, Ga., and Gilman, Vt., has appointed Malcolm Gray to the new post of manager of trade relations, effective immediately.

Mr. Gray, who has for some time combined the office of purchasing agent with extra-curricular duties as company representative in trade relations, now needs full time for his new and more responsible assignment. His primary activities will be to investigate raw materials, their uses and potentials within the framework of Gilman's expanding pulp and paper manufacturing and converting operations, and to study the application of such developments and potentials with companies that serve Gilman or are served by Gilman and its subsidiaries. He will also continue responsibility for purchasing of bulk chemicals and raw materials.

Clayton Russell

Russell Steps Up At Allied Paper

Clayton Russell has been named director of quality control at the Allied Paper Corp. Mr. Russell will assume overall direction of the quality control for the King, Monarch and Bryant Mill Divisions.

Mr. Russell has completed 13 years of continuous supervisory experience in the quality control and former technical control departments of Allied.

Great Northern Names Griffee Process Engineer

Great Northern Paper Co. has appointed Donald G. Griffee as process engineer. Mr. Griffee is a graduate of the University of Maine and since 1946 has been employed by the Eastern Fine Paper Division of Standard Packaging Corp., where he was resident manager of the Lincoln, Me., mill.

OBITUARIES

Robert E. Bundy, 55, president and general manager of Potlatch Forests, Inc., died November 26, four days after being hospitalized with a heart ailment.

Lawrence Charles Bathon, 36, vice president and sales manager of the Elk Paper Manufacturing Co., died suddenly at his home in Elkton, Md., on November 27.

Charles H. Champion, 64, Manager of the paper department of R. T. Vanderbilt Co., Inc., died suddenly on November 7 of a cerebral hemorrhage at Norwalk Hospital, Norwalk, Conn.

PJT NEWS OF CONVERTERS

CCA Names New Shipping Container Div. Sales Mgr.

Promotion of Roger B. Kirkpatrick to general sales manager for the eastern area of Container Corp. of America's shipping container division has been announced. Macon M. Dalton succeeds him as general manager of the company's Philadelphia container plant.

In his new post, Mr. Kirkpatrick will headquarter at Container Corp.'s New York office. The sales area he now heads is served by the company's container plants in Boston, Philadelphia, Baltimore, and Fernandina, Fla.

Gibson Cards and Nashua Plan Merger

Gibson Greeting Cards, Inc., of Cincinnati, and Nashua Corp. of Nashua, N.H., have announced agreement to form a joint enterprise known as G.N. Papers, Inc., to be equally owned by Gibson and Nashua and acquire the assets of Nashua Corp.'s Pakay division, which is engaged in the manufacture and sale of party paper products.

G.N. Papers, Inc., will continue to manufacture party paper products, and will have an exclusive sales arrangement with Gibson Greeting Cards whereby the latter's sales organization will market G.N. Papers' total product line in conjunction with Gibson's established greeting cards.

C. Russell Shaw, former divisional manufacturing manager of Nashua Corp., is to be general manager of G.N. Papers.

"Then, it's unanimous—aces and jokers wild; fifty cent limit."

Bemis Bros. Makes Three Sales Appointments

Three appointments within the sales operations of the Bemis Bro. Bag Co. were announced by C. W. Akin, executive vice-president. George W. Finlay has been named manager of the Wichita bag plant and sales division and will be succeeded as supervisor for multiwall bag sales in the company's general sales department in St. Louis by U. A. Tull. The latter's post as sales manager of the Memphis sales division will be filled by Donald H. Woodmansee, Jr.

Mr. Finlay will assume his new position February 28, 1961, upon the retirement of the present plant manager, M. E. Ocker. Mr. Tull's and Mr. Woodmansee's appointments are effective December 1.

Kanehl to Retire From PCA Post

F. O. Kanehl, a vice president and treasurer of the former Ohio Boxboard Co., and a financial executive of Packaging Corp. of America, has announced that he will retire from executive duties at the end of 1960.

Mr. Kanehl joined Ohio Boxboard in 1940 as controller from a managerial position with the accounting and auditing firm of Arthur Andersen and Co. He also served the Ohio Injector Co., of Wadsworth, Ohio, as vice president and treasurer, positions from which he is also retiring.

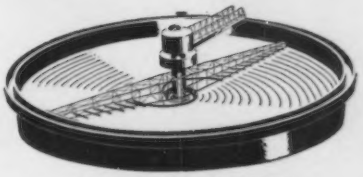
At the same time it was announced by James P. Friel, PCA director of traffic and transportation, that Robert J. Karlen has been appointed assistant director of traffic and transportation.

Mr. Karlen formerly was traffic manager of the company's eastern region. In his new post, he will be located at 111 West Washington Street, Chicago.

WATER & WASTE-TREATING

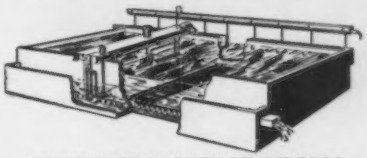
RECTANGULAR CLARIFIERS

Especially suited for limited spaces or where sludge delivery is desired at one end of the tank. A traveling scraper and skimmer carriage removes settled solids from the tank bottom and scum from the top.



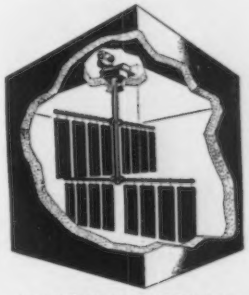
CIRCULAR CLARIFIERS

Hardinge Circular Clarifiers are available in sizes up to 200' diameter, either center-column or beam supported for steel, concrete, wood or tile tanks. Sludge scrapers remove settled solids rapidly through central underflow discharge.



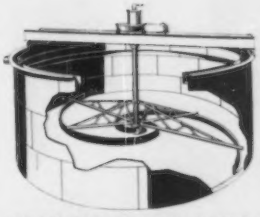
AUTOMATIC BACKWASH FILTERS

For high removal of non-settling or slow settling suspended matter. Self-cleaning sand bed. No shut-down necessary for backwashing. Traveling backwash mechanism.



FLOCCULATING UNITS

Slowly rotating paddles on vertical shafts bring the small flocs into contact to form larger masses and hasten precipitation.



"AUTO-RAISE" THICKENERS

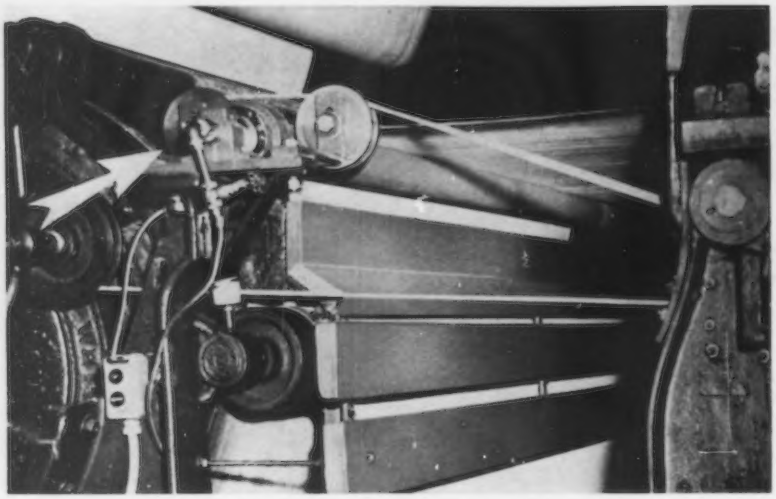
For removal of fine suspended solids from supply water, and waste water. "Auto-Raise" mechanism prevents scraper breakage. Manual or power raise supplements "Auto-Raise." Replaceable ring-type ball bearing support for rotating mechanism. Spiral rakes for maximum underflow density.

HARDINGE COMPANY, INCORPORATED

"Hardinge Equipment—Built Better to Last Longer."

NEW YORK TORONTO CHICAGO HIBBING SALT LAKE CITY SAN FRANCISCO HOUSTON LAKELAND BIRMINGHAM

NEW EQUIPMENT & SUPPLIES



Bow Spreader Roll with Only One Moving Part

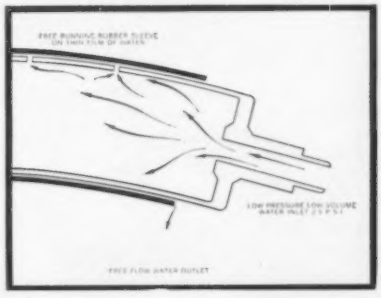
The design of the Rodney Hunt Aquatrol Expander embodies an entirely new principle of operation. With only one moving part — in contrast to the many moving parts of the conventional bow roll — the Aquatrol Expander operates with practically no friction. This single moving part is a rotating rubber sleeve. The secret of the design is that the sleeve floats on a film of water, under light or heavy pressure, to give an even spreading action over every increment of face width.

Only rubber sleeve turns, there are no bearings, bearing housings, or spacers to require maintenance. The rubber sleeve is replaced when necessary in the customer's own plant, in a matter of minutes, frequently without removing the roll from the machine. Several benefits accrue from the feature: the customer saves the cost of factory rebuilding, and of shipment to and from the factory, costly downtime and delays are eliminated, the cost of spare rolls to replace those being repaired is eliminated. Since there is no lubrication required the water not only replaces lubrication but cools the roll as well; and the danger of product contamination is greatly lessened.

All vital parts are of stainless steel or other corrosion-resistant material. The tube is manufactured of lightweight stainless steel. A roll of average size can be easily handled by only one man.

The simplicity of design and operation of the Aquatrol Expander (patents are pending) is shown in the cutaway diagram. First, a hollow stainless steel roll is bowed to the degree specified. Then a rubber sleeve is fitted over the perforated stainless steel body. A corrosion resistant water collector ring is fitted over each end of the roll to retain the sleeve and collect water overflow. In actual operation, water passes through the hollow shaft and through the perforations to form the film of water on which the sleeve floats. Water escaping from the ends of the sleeve is gathered by the collector rings and drained off.

Aquatrol is a trade name of the Rodney Hunt Machine Co. Further information and quotations on the expander roll to suit your requirement may be obtained by writing the company to Rodney Hunts' Industrial Roll Division, 960 Orange St., Orange, Mass.



In-Plant Refuse Collecting & Handling System

Dempster Bros. has announced the development of a refuse container handling unit, named the "Dinomaster," for use with the Dempster-Dinosaur. The Dinosaur, which has previously been used in paper plants for containerized cargo, chemicals, raw materials and waste products, now becomes a complete materials handling tool for large and small plants alike by the addition of the Dinomaster unit.

The development, which consists of a compaction body and two cab-clearance lifting arms mounted on a standard Dinosaur frame, can be operated as a self-loading packer when automatically pulled up on the Dinosaur skid frame and locked in place.

In operation, it is very similar to the Dempster-Dumpmaster in that it approaches a refuse storage container, engages the side channels, lifts it over the cab and empties the contents into its compaction body, where the material is squeezed to a fraction of its former volume by action of the 60,000-pound thrust of the packer plate.

Containers used are the standard

type design for use with the Dumpmaster, ranging from one-half through eight cubic yards capacity.

When the Dinosaur-mounted Dinomaster has completed its work of collecting a plant's refuse and emptying it at the disposal area, it can easily be disengaged from the Dinosaur chassis and put on the ground at a central location. Containers can then be brought by fork truck to the Dinomaster for dumping, while the Dinosaur goes about the plant performing other operations, handling large containers used for accumulations of heavier, bulkier waste materials. Or, with the addition of a stake-side body mounted on the Dinosaur pick-up structure, it can be used as a conventional truck.

Through its tilting frame hydrau-

THE MARK OF THE BEST IN FELTS

The blue and red stripes on this Super Plate Press Felt have identified all Huyck felts for close to 90 years.

No other feltmaker has come forward with so many "firsts" in felt-making and felt services as Huyck. No other felt has ever offered more advantages and economies.

Look for these familiar blue and red stripes on your felts and felt packages—THE MARK OF THE BEST IN FELTS *for your machines.*

HUYCK FELTS

Huyck Felt Co.,
Rensselaer, N. Y.;
Aliceville, Ala.;
Division of F. C. Huyck & Sons.
In Canada: Kenwood Mills Ltd.,
Arnprior, Ontario

NEW HUYCK FELTS ★ INDUSTRIAL FABRICS

FIRST IN QUALITY • FIRST IN SERVICE SINCE 1870

One in a series of interviews with the men who are "Virginia"

"We offer free mill trials to show the fine results and low cost of groundwood pulp one-stage hydro bleaching—the only cost to the mill is for the hydro"

George V. Rittenhouse (left) and Robert W. Barton

Technical Service Supervisor Bob Barton and District Manager George Rittenhouse, both of Virginia Smelting Company, answer questions about bleaching groundwood pulp with one stage of hydro.

Q Do zinc and sodium hydrosulfites provide the most economical method of one-stage pulp bleaching?

Mr. Barton—If the mill is going for anything between 2 and 11 brightness points, bleaching groundwood pulp with hydro is virtually always the cheapest method. It is easier to apply—there are no control tests involved—and the chemical cost is much lower.

Q Is it difficult to set up a trial run for a mill that might want it?

Mr. Barton—Not usually. Frequently much of the equipment we need is available in the mill. We go in with our lab equipment and make tests, checking the *p*H we're going to deal with, and possibly deciding on the maximum temperature possible. We give all the facts to the mill—and if they want the trial, we set it up. Often the mill has a pulp storage chest. A few changes and we can use it as a bleaching tank. We'll bring in feeders, attach hoses, and start the trial.

Mr. Rittenhouse—Our technical men stay there until the setup is running perfectly and they make sure the operators know everything they need to. You'd be surprised at what we run into sometimes, even in mills that have been bleaching regularly with hydro. They take the powdered hydro and dump it in on top of the stock. Of course, hydro breaks down fast when it is exposed to air, and they wind up with reaction times too short—temperature not showing the proper effect—and poor brightness response at the end. I might add that faulty mixing like this can cause a corrosion problem, too—a problem that does not arise if proper air-free mixing is standard procedure.

Mr. Barton—A good point, George. This is the chief reason why some mills are under the mistaken impression that hydro always causes a corrosion problem. If hydro is handled properly there's no corrosion problem.

Q Isn't a mill trial a pretty extensive service at no charge?

Mr. Rittenhouse—Yes, I suppose so—but I consider it the most effective way of showing a mill the economy and the good results obtainable with hydro. After all, mill trial data offer the most believable evidence of what I say. And production doesn't have to be stopped—we can almost always set up the mill trial without affecting it.

Q What are the advantages to the mill in using a "Virginia" hydro?

Mr. Barton—There are several. One is the consistently uniform quality and purity of our hydro, either the zinc or sodium. It's a very clean, free-flowing powder—made, packed and shipped as moisture-free as modern manufacturing methods can make it.

Mr. Rittenhouse—And of course our technical service goes with it. A mill can always call for assistance and get a "Virginia" technical man. It's the accepted thing with our customers.

• • •

FOR A FREE MILL TRIAL

—just drop us a line, phone or wire, and a representative will call on you at your convenience.

Industrial Division
VIRGINIA SMELTING COMPANY
Box 282, West Norfolk, Va.

VIRGINIA® Chemicals

Field Offices: New York • Boston • Chicago • Atlanta
Asheville • Philadelphia • Akron • Seattle • Memphis

Available in Canada and many other countries

An economical, high quality combination of starches from a single source for internal sizing and external coating...

GLOBE® and GLOBE® EASY-ENZ *starches*

WRITE OR PHONE *Corn Products for expert technical assistance... helpful data on these fine products for Papermakers:*

BUFFALO® • GLOBE® • TEN-O-FILM® • MILO-FILM® • TEXO-FILM® • FOXHEAD® starches • GLOBE® dextrines and gums • EXCELLO® dextrines

CORN PRODUCTS COMPANY INDUSTRIAL DIVISION • 10 East 56 Street, New York 22, N. Y.

PREPARE FOR PUMP OVER-HAUL IN LESS THAN ½ HOUR

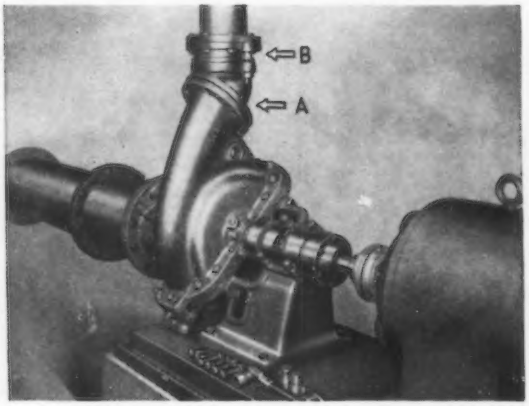
You can go right into this Goulds stock pump in less than thirty minutes should you want to check or take out its rotating element.

Diagonally split, hinged-cover casing with jacking bolts lets you open the casing quickly and easily.

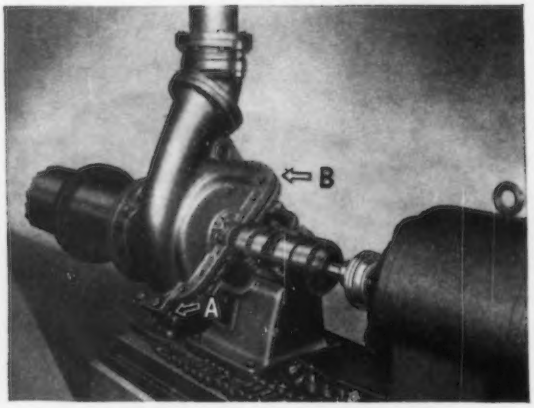
You can then remove the entire rotating element, including bearing assembly, without disturbing pipe connections.

Goulds Pumps Inc., Dept. PT-120, Seneca Falls, N. Y.

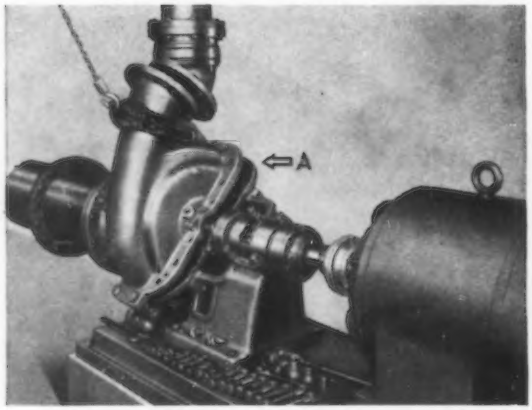
HERE'S ALL YOU DO:



1. Take out bolts connecting the discharge elbow and upper half pump casing (A). Loosen upper nuts on jacking arrangement (B), tighten lower nuts, telescope discharge elbow into discharge connection. Time: 5 minutes.



2. Remove parting bolts connecting two halves of pump casing. Loosen top nuts on hinge pins and tighten hex nuts (A) to raise casing. Complete flange break by means of jacking screw (B). Time: 15 minutes.



3. Attach chain fall through upper half pump casing. Using jack screws (A), continue raising casing. Time: 2 minutes.

4. Model 3135 pump is now completely open. Remove bearing cap, disconnect coupling. Rotating element now comes out easily. Time: 5 minutes.

GOULDS PUMPS

lic pick-up principle, the Dinosaur is able to handle a wide variety of containers up to 40 cu. yds. and larger, with loads limited only by the capacity of the truck and highway restrictions. Off-road models with capacities up to 80,000 lbs. are now available. Write Dempster Brothers, Dept. DN-51, Knoxville, Tenn., for further information.

Braided Teflon Packing Improved at Less Cost

An advanced production process now permits Garlock to market their corrosion-resistant, low-friction braided Teflon packing for a reported 40 per cent below current per cent prices. Designated Garlock style 5875, the white asbestos braided packing contains more than 30 per cent Teflon by actual weight. This type of packing has widespread application on rotary and centrifugal shafts, valve stems and expansion joints and reciprocating rods, plungers and rams. It has a temperature range from —90° F., to +500° F., and its low coefficient of friction is said to reduce wear to the packing and to mechanical components during start up and operation. It remains unaffected by moderately destructive and corrosive minerals acids and caustics.

Garlock uses its patented Lattice Braid construction in fabricating Style 5875. This method passes each strand of treated yarn diagonally through the packing body at a 45° angle and results in a stronger, more unified structure independent of any single cover or layer to wear through and fail. Because of the unified structure and heavy Teflon impregnation, only moderate gland pressure is necessary to ready the packing for immediate operation upon installation. The packing is available in ¼ through ⅝ inch sizes in 1/16 inch increments in either spool, reel or ring form.

For further information, write to Garlock Inc., 457 Main Street, Palmyra, N.Y.

Submersible Motors Are Pressure Proof

A line of submersible ac motors has been introduced by Reliance Electric and Engineering Co. The pressure-proof motors, especially designed for close-coupling to centrifugal pumps operating in any depth of water, oil or liquid chemicals are now available in sizes from ½ through 40 horsepower for operation from polyphase power sources, and from ¾ through 5 horsepower for single-phase connection.

The motors are rated at 55° C. temperature rise for 30-minute duty in 40° C. air, and for continuous duty in 40° C. liquids.

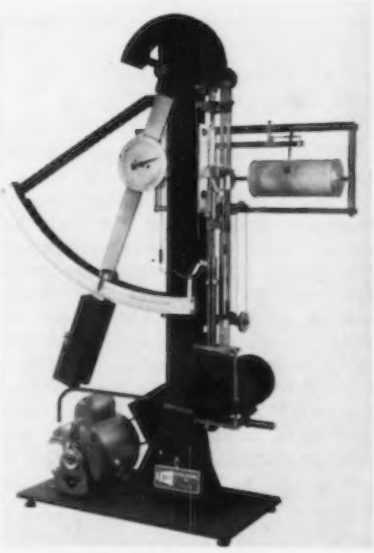
The one-piece, ribbed housing of the motors is leakproof. Both the cast-iron motor frame and mounting base are said to be impervious to corrosion.

Of "Liqui-Seal" construction, the Reliance submersible motors are oil-filled to protect against bearing wear. They never need additional lubrication. The leak-proof construction seals in the motor oil as it seals out foreign contaminants. The "heart" of the construction is a specially designed neoprene diaphragm with a built-in O-ring, which completely encircles the motor base to disperse pressure differences over a large area. If internal and external pressures differ, due to heat or depth of immersion, the diaphragm flexes slightly to neutralize the pressure, thereby relieving pressure build-up around the O-ring and the positive shaft seal.

A reconnectable dual-voltage feature is available on single-phase units from ¾ through 2 horsepower, and on all polyphase motors. The impeller mounts directly on the motor shaft; the motor shaft serves as the pump shaft. The special universal mounting flange fits most standard pumps, and modifications can be made to meet special dimensional requirements. The pump-and-motor assembly can be lowered into position as a single unit.

Single-phase control panels are available to meet specific customer requirements. The basic control consists of necessary capacitors and a voltage relay. Locked rotor protection and overload protection may be added. An optional control feature is thermal protectors imbedded in the motor winding, so as to prevent failure if the motor is operated non-submerged for extended periods. For complete details, write to the A-c. Products Dept., Reliance Electric and Engineering Co., 24701 Euclid Avenue, Cleveland 17, Ohio.

(Continued on page 62)



TMI SCHOPPER TENSILE TESTER is now available with mechanical autographic recorder. The basic tensile tester, using a dead weight pendulum with a choice of several strength ranges, can be furnished with two testing speeds or with infinitely variable speed along with a "fast return" to save the operator's time where a high test volume is involved. In addition to performing tensile tests on paper, film and foil, this same equipment with two small attachments, can perform edge tear tests or "wet strength" tensile tests while the specimen is immersed in a water receptacle attached to the lower testing jaw. For complete details write to Testing Machines, Inc., 72 Jericho Turnpike, Mineola, N. Y.

MAINTENANCE SERIES
NUMBER 32

Reducing Drum Barker Troubles Through Preventive Maintenance

A down-to-earth practical discussion of the care of barking drums and specific instructions for when maintenance is necessary. Plus a touch of humor here and there.

Vincent Dawson,
Supervisor Field Engineering,
Pulp & Paper Division,
Canadian Ingersoll-Rand

A barking drum, mechanically, is one of the simplest things around a mill. Sometimes, by virtue of its job, location, etc., it is one of the most neglected pieces of equipment. As a result, maintenance costs can be, and often are, out of all proportion to its mechanical simplicity. It follows, then, that a little well-directed time and effort can be very rewarding in reduction of maintenance costs, and it is hoped that these notes, compiled largely from personal observation of what is frequently not done around a drum installation, will help in some measure toward lower maintenance costs per cord.

Lubrication

Lubrication is a very pertinent case in point. In the great majority of installations, grease nipples and oil cups are located right on the actual, individual, bearing, and as a result the oiler must make several trips up and down ladders and catwalks, and even, in extreme cases, crawl half-way under the drum to do a complete job. Considering human nature and the generally unpleasant conditions surrounding most installations, with a suggestion of, and sometimes real, personal hazard involved, it is actually not surprising that bearings often fail from lack of lubrication, in spite of "once per shift" lubrication schedules!

It is, therefore, well worth while to consider the installation of an automatic central lubrication system. Such a system, costing less than the annual wage of one oiler, eliminates the human element, ensures correct lubrication at all times, and, there can be no doubt, pays dividends in reduced maintenance costs over the years. A lesser alternative, but often quite satisfactory, is to connect tubing to all nipples and oil holes, and lead them to one central, easily accessible station, from where the oiler can attend to all lubrication points with ease and dispatch.

Adequate lubrication of the ring gear and drive pinion has always been a problem, even when given the best possible attention. This is because the thick, heavy grease normally used must be heated and then "painted" on the ring gear while the drum is stopped. As a result, there is an excess of lubricant immediately following an application, which however, rapidly washes and wipes away, so that the gear and pinion teeth are dry of lubricant again some time before it is possible to stop the drum long enough for another application. As a solution, some people have installed drip type oilers over the pinion, achieving fairly satisfactory results. Where centralized automatic lubrication systems are used, whether mist-spray or pressure types, it is a simple matter to arrange additional outlets at the drive pinions, and, on the theory that constant lubrication with any kind of oil or grease is just that much better than intermittent and inadequate lubrication with the best type, this installation achieves good results.

Any discussion of barking drum lubrication should note a relatively new problem. This has to do with lubrication of the contact faces of the tires and supporting rollers on trunnion-roller type drums. For many years, when the typical drum operation included large quantities of water from heavy showers, the tire and roller faces were always wet, which seemed to afford enough lubrication here, but with the advent of the "Hydrovat" type of drum, in which the water is contained, and the apparent increase in popularity of "dry" barking, with no showers, tires and rollers are bone dry on the contact faces, and accelerated wear has been noticed in such cases.

This wear must be the result of slight but constant slippage of the tire on the rollers, since the tires actually drive the rollers, and the rather low co-efficient of friction between tire and roller is only slightly greater than that of the roller-shaft bearings, especially so in cooler temperatures. If unchecked such wear can have far-reaching and serious results. The load in a barking drum is far from uniform, being greater on

one side than the other, and also at the inlet end. This results in an uneven rate of wear, which, in effect, lowers the drum on one corner, so to speak. On the chain-hung type of drum, this condition is duplicated when the supporting chains "stretch" unevenly because of wear on the chain links and pins. Inevitably, under these conditions, a heavy end-thrust of the whole drum develops, which is taken on the side face of the tire and the flanges of the rollers. Where anti-thrust rollers are employed they are subject to heavy over-loads. In any case, extremely rapid wear occurs, necessitating expensive repairs or replacement. Further, the cyclic distortion of the drum structure due to revolving while out of alignment, can only lead to weld failures and broken bolts.

The problem, then, is serious enough. To solve it, bearing in mind the wet rollers on drums with showers, attempts were made to use water sprays to the roller faces on otherwise "dry" type barking drums. Because of the very small amount of water required, however, the spray nozzles were necessarily very fine, and rapidly and repeatedly clogged up. Blocks of solid grease held on a roller face in an open frame proved very satisfactory from a lubrication point of view, but was rather messy, and used up far more grease than required, since the grease built up on the roller flanges and continually fell off on to the roller shaft, bearing housings, and concrete foundation.

An economical and satisfactory method of lubricating roller and tire surfaces is to mount a solid graphite block in an open frame holder on one roller of each pair, similar to the previously mentioned grease block. (Figure 1.) The block should be free to slide down on the frame as it wears, by virtue of its own weight. A suitable open ended box holder is simple to make from light gauge steel strip or plate, and can be attached usually to the bark deflector apron just over the roller. Another method is to mount a drip oiler over one roller of each pair. The quantity can be regulated down to the very small amount actually required. A standard machinery oil appears satisfactory. Of course, once more, where an automatic lubrication system is installed, it is a simple matter to incorporate the extra oil lines.

End-Thrust and its Effects

Earlier, we mentioned end thrust of the drum shell as a result of uneven wear on the supporting rollers. This condition, however, can arise from several other causes, but whenever it occurs, the origin should be sought for without delay, if expensive repairs or replacements are to be avoided. But first, a few words about the phenomenon itself. To confuse the issue, there is always a *normal* amount of end-thrust present in a drum under operating conditions. But we have reference here to *abnormal* end-thrust, and the distinction often becomes a matter of nice judgment. There are, however, sign posts to guide us. Today, barking drums are erected as level as possible in contra-distinction to the practice in vogue 20 or so years ago, when they were usually set up with a slope towards the outlet end of about a quarter inch per foot. When operating, the movement of the wood in the drum tends to carry the shell in the same direction, generating a thrust towards the outlet end. This is *normal* end-thrust, relatively light,

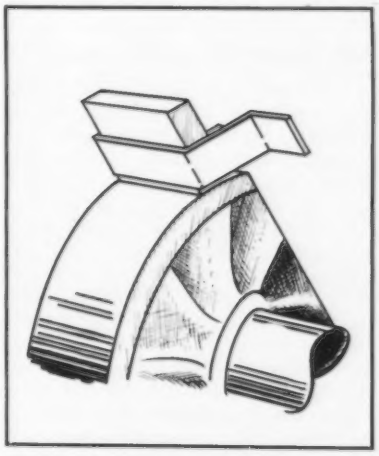


FIGURE 1: ROLLER LUBRICATION. Mount a solid graphite block in an open frame holder, free enough to slide down of its own weight against the surface.

and the roller flanges or anti-thrust rollers are designed to counteract it without detrimental effects.

If the drum is riding very evenly on its rollers, the edges of the tires not contacting the roller flanges on the outlet side, don't be misled, you have end-thrust! Before rushing out to do a re-aligning job, however, let us say that under these conditions the forces counteracting the natural thrust of the wood-load are no greater than these wood-load forces themselves, and in fact, drums are often deliberately set up this way—that is to say, to ride evenly on the rollers when operating.

Since such an anti-*normal*-thrust effect (if we can so christen it) is usually generated by a slight (a very, very slight) rotational displacement of one or more support rollers in the horizontal plane, there is a difference in the resultant wear of parts, as compared to what occurs when this normal wood-load thrust is taken in the normal way, on the corners of the tires and the flanges of the rollers. In the latter case, the roller flanges gradually get thinner and the tire corners assume an ever increasing radius, but the tire and roller faces remain flat.

On the other hand, when a drum is so set up, intentionally or otherwise, with sufficient out-of-alignment of a roller or rollers to just balance the wood-load thrust, one can look for the tire face to become slightly concave, with a corresponding convexity on the roller face. Conversely, if and when such a wear pattern appears, it is a definite indication of something out of line down below!

Much more serious is the deterioration which sets in when a drum shell exhibits a definite thrust towards the inlet end of the drum. The indication here is that one or more rollers are rather badly out of alignment, the forces involved are heavy and while the culprit roller is grinding itself concave and the tire convex, other rollers are subject to excessive wear on the flanges while counteracting the endways push. Likewise, the tire edges are rapidly worn down, while the thrust bearings on the roller shafts are apt to be overloaded. All this, of course, can occur in the opposite direction, when thrust towards the outlet end exceeds that due to wood-loads. And how do support rollers get out of line? Briefly mentioning that the erector could have been looking out of the window when they were installed, the other thing, sadly enough, is—loose trunnion bearing hold-down bolts. Before firing the mechanic, let us say in justice to him that he could check them today and they could be loose next week, if not tomorrow.

Supporting Roller Problems

It is a barking drum's fate to be subjected continually to very heavy shock loads, and wide amplitudes and frequencies of vibration, all transmitted through the bearing housing bases to the sole plates and foundation. All this tends to shake nuts loose, but there could also be another factor. Sometimes pieces of wood are hammered by the tumbling load into the narrow spaces between heads and foundation, or between drum sections. For a while, before

they become ground down, they exert a wedging action, causing heavy end thrust, which, exerted by the tires against the roller flanges becomes an overturning moment on the bearing bases, resisted by tension in the bearing hold-down bolts. There's quite a lever arm from the top of the roller to the bearing base! This treatment, repeated often enough *could* stretch the bolts a bit. Another contributing factor is undoubtedly oxidation of the mating surfaces of bearing housings and sole plates. Hardly anyone, least of all the writer, really appreciates having to poke around underneath the average barking drum installation checking for loose bolts, but certainly a little more attention than these parts usually get, would pay off. It is also possible to minimize the entry of pieces of wood between, or at the ends, of sections, by not allowing the flanges of the rollers to get too thin before building them up, or replacing the roller.

Originally, the width between roller flanges allows only perhaps a quarter of inch sideways tire movement, but over the years, both tire edge and roller flange wear away to allow much more than this, and then the trouble starts. It would be a good idea, on older drums whose tire edges have become badly worn, to replace flanged rollers with new ones having thicker flanges than original equipment, thereby restoring the limits of tire (and shell) movement to something nearer the design tolerances.

Why Tire Bolts Break

One of the most annoying problems, chiefly on account of its frequency and nuisance value, is the breakage of tire attachment bolts. This is one of those things which, theoretically, could never happen, yet in fact is the most exasperating problem on a surprising number of barking drums. It should never happen because "all things being equal" there is little more load on these bolts than the tensile stress due to nut tightening, and any old 1¼ inch bolt ought to stand a reasonable amount of this. Nevertheless, in some cases, even high-tensile bolts have been tried and found wanting. Obviously, in these instances all things are *not* equal and some "unequalizer" greater than the strong arm of the maintenance mechanic is at work.

There can only be one thing at the root of this trouble, and that thing is a slight gap, clearance or "play" between the inner bore of the tire and the outer face of the circumferential plate inside the tire. Unfortunately, it is a practical impossibility to finish up the assembly and welding of a barking drum with these plates a snug fit in the tires. This is recognized, and it is standard practice to insert numerous shims around the circumference of the drum in the (usually) small gap between tires and plates. We sometimes wonder if we would not be better off in the end if this gap *was* a little wider, since it is much easier to drive in thick shims than thin ones. Be that as it may, shims of appropriate thickness are used, and in large quantities.

Now, alas, it sometimes happens that some of these shims work out again, or even may be still there but not tight enough. But whatever the reason, if any gap at all remains, or re-appears, the tire bolts are thereby subjected to high, cyclic tensile loading as they rotate to the top of the drum in turn, and the entire shell plus load "hangs" from them.

Solution to Tire Bolt Breakage

It should be obvious that under the circumstances it is utterly useless simply to replace a broken bolt with a new one. It should be an axiom never to replace a broken tire bolt without also inserting a shim. The bolt should "bite" on a solid sandwich of tire flange, shim, and tire plate. Otherwise, it is just a matter of time before the new bolt breaks, be it of the highest of high tensile steel.

When tire bolt breakage is chronic, it pays to do a complete re-shimming job at the first opportunity. Instead of re-shimming all round each tire, we suggest the following procedure, which should cut the usual time almost in half. First prepare four wedges, by forging the ends of old automobile axle shafts or similar bars. These are better than short wedges made from old files since they are longer, easier to hit with a sledge, can be hand-held while driving, and are easier to pull out.

Then, slack off all tire bolt nuts on the upper half of each tire, and remove the existing shims, if any. Rotate the drum 180°, and slack off the remaining nuts, which are now on the top half of the drum. Rock the drum (don't rotate) several times. This allows the tire plates to assume their natural shapes, and settles them solidly on the bottom of the tires. The maximum gap will now show on the upper half of the drum.

Measure the gap on each side of the two top-most bolts on opposite sides of the tire, and prepare suitable shims. Drive two wedges about five or six inches apart on each side of both bolts and insert the shims, as close to the bolts as possible. Repeat this procedure with the other bolts. It is a help here if, after shimming about 16 bolts, (eight on each flange) on all tires, the drum could be revolved first 45° one way, and then the other, to bring the lower bolts up nearer top center, thus generating the maximum possible gap.

Check all shims again, and tighten the nuts, making sure they pull down solidly, with no tendency to pull up on the plates. Rotate the drum to bring the half that was originally on top to that position again, and check for possible gaps close to each bolt. Shim these, if any, and tighten the nuts. It is highly unlikely there will be any necessity to shim on this half. It has been said that this method, compared with shimming all around, makes the drum slightly eccentric. Practically, an eccentricity of about one sixteenth of an inch on a 12-foot diameter is not worth considering, and the saving in time is appreciable. Experience definitely proves that if shimming is done properly bolt failures are eliminated entirely.

We suppose it is quite possible to design a barking drum so big, strong and sturdy that weld failures would never occur. It is also equally possible that no one could afford to buy such a drum. Engineering must always compromise, and also since there is no perfection on this earth, it follows that in a structure with so much welding, some of it, to a greater or less degree, is something less than perfect, and some weld cracking is to be expected under the constant pounding and vibration.

Weld Cracking

The repair of cracked welds in a dynamic structure like a barking drum is not something that can be put off until some convenient time without accepting the penalty of a large increase in both size and number of failures. Each hour a cracked weld is left unrepaired sees it grow in length, overloading adjacent welds by its own failure, and contributing to their early failure also. What would have been a very minor repair to five or six short cracks if caught early enough, becomes a major operation on two or three hundred serious failures at the end of a year.

It would be impractical to suggest a check on all welded joints every two or three weeks, but perhaps it is not necessary. A more practical suggestion is that at *every opportunity*

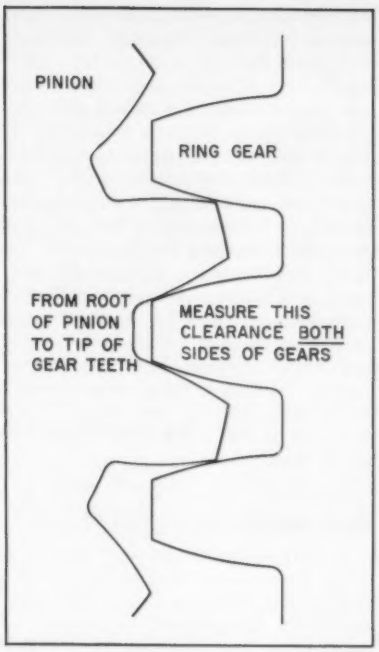


FIGURE 2: CHECKING MESH. Measure distance from the tip of the ring gear tooth to the root of the pinion tooth only.

compatible with operating schedules, but certainly at not any longer intervals than three months, the joints at the *heads only* be inspected and repaired if necessary. That is to say, the fillet welds joining the staves to the heads. Experience has shown that these are the joints subject to the highest stresses, situated as they are on a cantilevered portion of the drum, and sustaining the additional shock of the wood entering or leaving the drum. Usually, it is only after these welds have let go that damage extends to the interior.

With a schedule as above one should not expect to find more than three to six minor cracks, if any, at any given time, but prompt attention to these should cut out the necessity of a major annual job. Don't forget to have a look at the interior welds once a year—oftener if possible.

As a footnote, if we had to list the weld locations in a barking drum in decreasing order of possible failure, they would be: (1) Drum inlet head; (2) Drum outlet head; (3) Intermediate section heads; (4) interior.

Maintenance of Drive Gears

Considering the drive gear and pinion, some operators simply allow them to run until the driven ring gear is worn out, by which time the pinion has generally also "had it." Somewhere along the life span of the ring gear, wear on the teeth reduces them to the point where the original tooth "form" is lost, and consequently, from there on, wear on both gear and pinion proceeds with increasing rapidity. If however, at this point, the ring gear was reversed, presenting the hitherto untouched teeth faces to the pinion, the life of the ring gear would be appreciably prolonged.

Drum Alignment Short Cuts

And now, finally, comes the sticky problem of realignment of a drum, which for a number of reasons, may have become out of line, either in the vertical or horizontal plane, or both. It goes without saying that by the time such work becomes necessary, all centers and reference marks used on the original installation have long since eroded or corroded away.

The first job, obviously, is to check that the foundation itself, or one or more of the trunnion bearing piers, have not settled in the course of time. Assuming we are lucky in this respect, it follows then that the soleplates under the trunnion bearing housings are as installed, all the same elevation, and level. The next job is to check the diameters of all the rollers, and any new ones that may be going in, to ensure they all are of equal diameters. This being done, we are at least assured of a level base for the drum, IF the supporting rollers are in longitudinal alignment, that is, equidistant from the drum longitudinal center. So here we go again—looking for that long-lost center.

Instead of digging out blue prints and trying to find reference points from which to string cross wires so we can hang plumb lines etc., etc., just use the drive shaft, pinions and gears as reference points for aligning in the horizontal plane, and a transit or level for alignment in the vertical plane, in this way: Check the mesh of the drive shaft pinion and its driven ring gear, checking at both sides of the pinion in each case, and measuring from the TIP of the ring gear teeth to the ROOT of the pinion teeth. (Figure 2.) This is because, while the pinion is machined all over, the big ring gear is usually a casting, machined on the side faces and teeth tips only, the root remaining as cast. By measuring as above, we get the accurate dimension from one machined surface to another. This distance is usually ½" but can be verified by the drum manufacturer.

Take checks at each 90° of rotation, and average, because it is quite likely the gear casting will be slightly oval from its years of service. If there is a difference in this dimension, from one side of a given pinion to the other, the necessary pair of trunnions are moved equally and in

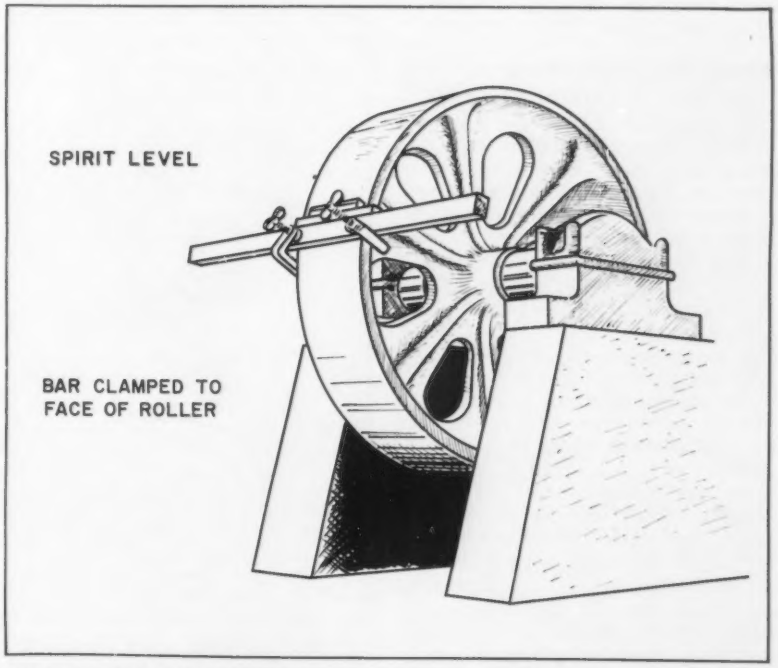


FIGURE 3: ALIGNING ROLLERS. Clamp a bar level across the face of the roller, even with the horizontal center line of the drum.

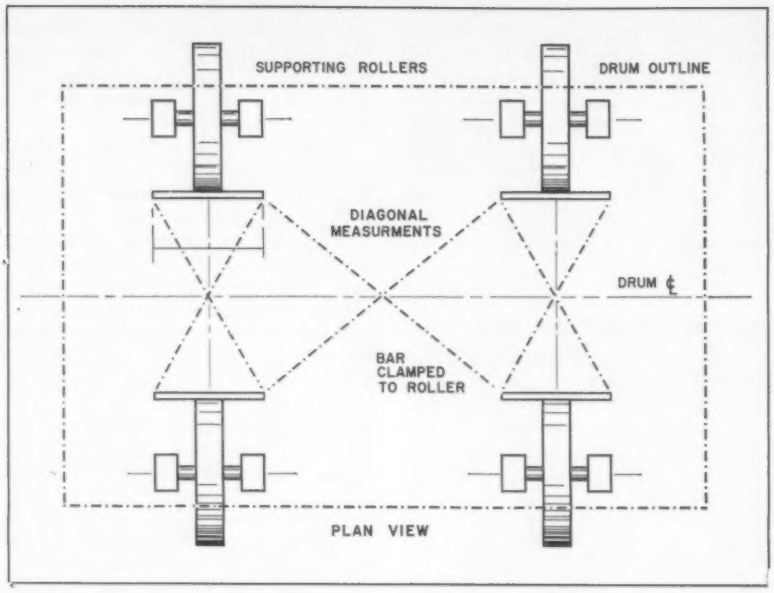


FIGURE 4: ALIGNING ROLLERS. Measure diagonal from clamped bar to clamped bar to determine parallelism of rollers.

the same direction to move the end of the drum in the right direction. While this is going on, a levelling "sight" should be taken along the top of the drum shell, from head to head. It is possible, while squaring the drum with the drive pinion, to adjust for level at the same time. After doing this to both, or all three, sections as the case may be, measure from the drive shaft top center to each drum shell head, as a check.

Eliminating Guess Work

So, now the drum is on a reasonably even keel! The chances are excellent however, if started up without further effort, that after all the messing around with support trunnions, it will immediately attempt to climb right through one or the other end of the foundation. By all means try it, though. You may be lucky! Otherwise, if our suspicions are correct, there is nothing to do but check the trunnion rollers and adjust as required.

Get some steel strip, or bar stock, one for each roller. The dimensions are not critical, about 1 inch x 2 inches x 48 inches would do, but they *must* be straight, and of equal lengths. These are to be clamped *across* the faces (or treads) of the rollers, on the inside, toward the center of the foundation, at the horizontal center line of the rollers, and levelled with a bubble level. (Figure 3.) They should be adjusted so that each is equi-distant about the vertical center line of each roller face. The purpose of all this is to magnify any out-of-parallelity of each pair, and of the whole set, this being determined by the old dodge of diagonal measurements from the extremities of the bars. (Figure 4.) Once more, those simple words which cover much sweat and toil—"Adjust as necessary"!

Having thus restored the drum and support trunnions to something resembling alignment, there only remains the final "tune-up" touch. If the drum has any appreciable "mileage" on it, the tire and roller treads are bound to be in a rather different condition than when it was new. By using the method advocated above, rather than working to original center lines, any slight discrepancies have been taken care of, but, because we have disturbed the run in "fit" of tires and trunnion rollers, we now have a condition causing different pressures across the contact area, and often this is sufficient to create the type of end-thrust described earlier in this article, even though drum and supports are as level and true as it is humanly possible to make them.

Detecting Excessive End-Thrust

You might just as well run the drum under load for a while for the final check, because if it is adjusted empty, in all probability it will require some further work when under load, which is the way these things are usually run. Unfortunately there is no scientific way, or book of rules, to determine just what to look for now. A cetrain sixth sense, or "feeling" is required. Broadly speaking we are trying to detect excessive end-thrust, and, as mentioned earlier, this is where nice judgment is required so as not to be fooled by what we called "normal" end thrust. This is why some people say "the

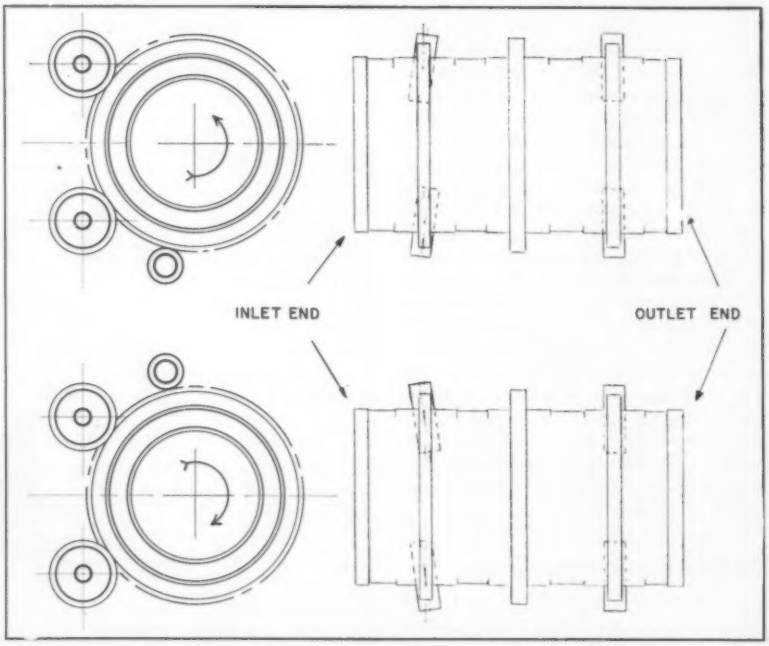


FIGURE 5: CORRECTING END THRUST. Rotate support roller as shown according to the drum's rotation by advancing one shaft bearing housing.

heck with it!" at this stage, and set the drum up to ride as evenly as possible, without even the normal amount of thrust toward the outlet end caused by the wood load.

Of course, if the drum, (or any section) pushes toward the inlet end, that must be stopped. If it pushes toward the outlet end, call up that sixth sense and feel for vibrations in the trunnion bearing housings, sole plates, and concrete piers. Look for filings thrown from the corners of the tires and roller flanges, or a thin brightly polished line around the roller in the corner of the flange.

Eliminating End Thrust

Adjustment to correct end thrust in either direction is done by very slightly rotating, or "cutting" one or more rollers, as commonly performed on lime kilns, but to a much less degree in this case. (Figure 5.) On drums with large diameter supporting rollers, the bearing housings are usually mounted on independent sole plates, so that rotation of the unit as a whole is not possible. To rotate a support roller, one of the roller shaft bearing housings is advanced on its sole plate, by loosening the hold-down bolts, and backing off on the jack screw. This should not exceed 1/16 inch at a time, and usually when one bearing housing has been advanced by about ⅛ inch or 3/16 inch, the labyrinth seals on the shaft will bind. The seal should be closely checked with feeler gauges while this operation is carried out. If it proves impossible to cut an individual roller enough to achieve the desired result before the seals bind, cut the other roller of the pair, (on the same tire) as well. It should not be necessary to adjust more than one pair of rollers on any one drum section. The big thing here is to go slowly, keep the adjustments at a minimum, in very small increments at a time, and allow a few minutes observation of the result of each adjustment before proceeding further.

The bearing housings can be moved out, away from the drum longitudinal center-line, quite easily. It can be done, if necessary, while the drum is in operation. To move them in, towards the drum center, requires jacking the drum up to take the pressure off the trunnion bearing housings. So don't overdo it, and make it necessary to move them back in!

Admittedly some of the methods outlined in this article are rough-and-ready, rule-of-thumb, trial-and-error stuff. Their principal merit is that they seem to work. We hope they suggest better ones to you!

PJT NEW LITERATURE

Centrifugal Pump

Includes charts showing the recommended temperature and pressure ranges for ten classifications of Dean Brothers Pumps—from minus 350°F. to plus 1000°F., and up to 1000 psig. Illustrations, brief descriptions and specifications are shown for each. 12 pp. Booklet. Dean Brothers Pumps, Inc., 323 West 10th Street, Indianapolis 7, Ind.

American Upstroke and Downstroke Balers

Describes the Upstroke Baler which is the first really new upstroke in design and function in 25 years, and The American Downstroke Baler, containing product features, capacities and information valuable to those in need of upgrading their baler facilities. Bulletins. The American Baler Co., Bellevue, Ohio.

Fluidics Buyers Guide

Explains Fluidics—the science of fluid processes—as a new Pfaudler Permutit program providing a modern, imaginative approach, plus specialized materials and equipment, for handling and processing more profitably the liquids and gases used by industry. Illustrates with photos and engineering data specific unit operations or integrated continuous operations. 16 pp. Bulletin #992. Pfaudler Div. of Pfaudler Permutit, Inc., 1121 West Ave., Rochester, N. Y.

P-T-E Lubricator Model 606D

Gives the low-cost answer to many troublesome industrial lubricating problems! This new model uses pneumatic pressure to assure constant lubricant pressure. Just fill the lubricant reservoir, and charge the air tank (or use regular compressed air supply if available), set controls for the lubricant pressure you want, and relax! 2 pp. Bulletin Pan-Tech Engineering Co., P. O. Box 22491, Houston 27, Texas.

OIC Gate Valves

Covers new line of gate valves designed specifically for Ductile Iron, describing both the PIPE-PAL series of, ½-inch through 2-inch small gate valves featuring spiral-wound gaskets and a unique "spread flange design," and the Pipe-Mate series of, 2 inches through 12 inches, large gate valves incorporating a new and stronger "buttressed flange" construction. Lists complete engineering specifications, pressure-temperature ratings, testing data and the advantages it offers in the valve field. 12 pp. Brochure 1011. The Ohio Injector Co., Wadsworth, Ohio.

Press Peeler

Describes the applications of its roll covering which include kraft and kraft specialties, cigarette paper and semi-chemical corrugating stock. Also technical information on hardness range, thickness, temperature, chemical and abrasive resistance and pressures. 2 pp. Catalog Product Service Dept., Stowe-Woodward, Inc., 181 Oak St., Newton Upper Falls, Mass.

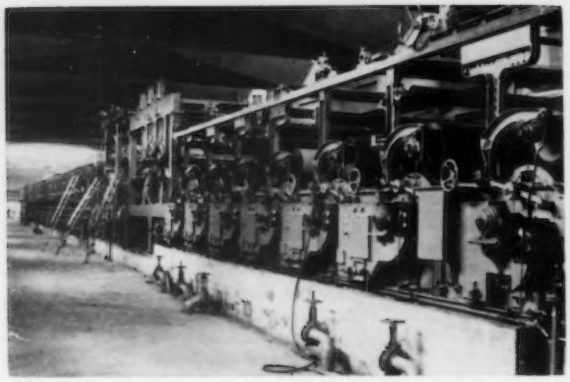
Unique Bow Spreader Roll

The Aquatrol Expander (patent pending), a unique bow spreader roll, is described as embodying an entirely new principle of operation. With only one moving part—in contrast to the many moving parts of the conventional bow roll—the Aquatrol Expander operates with practically no friction. The single moving part is a rotating rubber sleeve that floats on a film of water to give uniform, smooth, even spreading action over every increment of face width. In addition to describing the economic benefits and design features of the roll, the bulletin incorporates a handy form for requesting a quotation on an Aquatrol Expander. 4 pp. Bulletin 960. Rodney Machine Co., Industrial Roll Div., 960 Maple St., Orange, Mass.

Weight Tables for Welded Steel Tubing

Gives dimensions and weight per foot for round mechanical tubing up to 10 inches square and rectangular up to 5 inches, and pressure tubing up to 5 inches. Gives decimal equivalents for fractional parts of a pipe foot, and diameters and weights for pipe sizes (plain ends). 16 pp. Brochure. Electric-weld Tube Div., Jones & Laughlin Steel Corp., 3 Gateway Center, Pittsburgh, Pa.

Operating floor for top and filler Hydrapulpers.



Wet end view of the seven cylinder machine.

Mexico City's New Paperboard Mill Begins Production

New mill of Empaques Modernas San Pablo is now undergoing trial runs. Pictures presented here are the first published since the mill was completed.

A new board mill has been built by Empaques Modernas, San Pablo, S. A., on the outskirts of Mexico City. The new company is headed by Luis González Diez, general manager.

The mill is designed for the manufacture of liner board, folding boxboard and corrugating medium on a cylinder machine with a top production of 120 tons per 24 hours. A complete corrugated and folding box plant are located on the mill site.

Building design is unusual in that there are two structural patterns; one a reinforced concrete double cantilever saw-tooth roofing and another with parobolic four-inch thin shell roofs also of reinforced concrete, light being provided between each thin shell panels and between the curved roof and the brick walls. Due to the low bearing capacity of the soil in Mexico City, a box type, compensated foundation was used as the most practical solution.

Stock Systems

Heated water is provided for charging a 14-foot Black Clawson batch Hydrapulper, discharging into a tile-lined 1200 cubic foot dump chest, provided with 36-in. dia. propeller agitators; from here the stock is pumped to an eight-inch Vortrap with automatic reject valve. The accepted stock goes to a Black Clawson, air couch type thickener, 36-in. dia. x 108-in., discharging into a tile-lined, 275 cubic foot "Standpipe," and is then pumped to a DeZurik consistency regulator feeding regulated stock to a B-C Cyclafiner. The stock is discharged by gravity from the Cyclafiner to a 1200 cubic foot refiner chest from where it is pumped through a headbox, to a Mammoth Jr. jordan and drops to a 1500 cubic foot machine chest with 36-in. dia. agitator. The stock for the machine is pumped to a multiple stainless steel stock distributing box, through two 610 Vorjects and then to a Bird screen, mixing box and machine vats.

The bottom liner system is similar, except for the addition of a Shartle Classifiner, having 3/16-inch perforations, between the eight-inch Vortrap and the thickener. Also a Miami refiner is provided instead of the Cyclifiner.

There is a 14-foot continuous Hydrapulper for the filler system. From the Hydrapulper regulating box the stock is pumped to two eight-inch Vortraps. Accepted stock goes, via a headbox to two Classifiners and the accepted stock from these to a Black Clawson 36-in. dia. x 136-in. air couch type thickener. Thickened stock goes to a standpipe from which it is pumped to a 1200 cubic foot refiner chest; stock from this chest goes to a DeZurik consistency regulator and thence to two Mammoth Jr. jordans discharging by gravity to a 1500 cubic foot machine chest, with 36-in. dia. propeller agitators. Stock is pumped from the machine chest to a stainless steel multiple stock distributing box and to a 36-in. dia. Bird screen, mixing box and to the filler vats. Rejects from the Classifiners are sent via a headbox to a disintegrator, discharging into a Jönsson screen. Accepted stock from the Jönsson screen is sent back to the Hyrdapulper regulating box.

White Water System

White water from the top liner cylinders is sent to a constant level 3,000 g.p.m. white water tank. Water from the bottom liner vats is sent to another 5000 gallon white water chest. From both of these chests white water for dilution purposes, consistency regulation, etc. are drawn and excess is sent to the filler white water chest from which requirements for system are taken. Overflow from the filler white water chest is sent to a 4000-gallon saveall chest and it is pumped to a Krofta flotation saveall and recovered fibers are sent to the Hydrapulper regulating box of the filler system.

Cylinder Machine

The used board machine was largely rebuilt at Empaques own work shop but most of the wet end is new. The machine was originally built by Downingtown for a 87-90-inch trim and a maximum speed of 450 ft./min. The new wet end has seven vats with 36-in. dia. cylinder moulds; a suction drum roll 30-in. dia. three baby presses, the middle one with suction and room for a future fourth baby press; one plain, 22-in. dia. crownless main press; one plain, reverse 20-in. dia. second press and one plain straight, 20-in. dia. third press. All the above equipment was supplied from Manchester Machine Co., and all presses are pneumatically operated. Manchester also provided the wet end hydraulic helper drive, driving three vats, suction drum, second suction baby press and top first main press rolls.

Vacuum pumps were supplied by Nash, second and third felts are provided with Vickery felt conditioners and top and bottom main felts are equipped with Mount Hope felt cleaning system with Downingtown suction felt rolls. Stock pumps are by Warren and water and white water pumps from Worthington.

The dryer section has 79 dryers, 42-in. dia. x 92-in. face arranged in three decks, and there are six driven sections. A Norgen Microfog lubrication system has been provided, also a Ross Midwest Fulton condensate removal system and a Ross Engineering Co. hot air system. The original Downingtown seven-roll wet stack and a nine-roll dry stack are used at the end of the machine, together with a two-drum upright reel and a Langston winder.

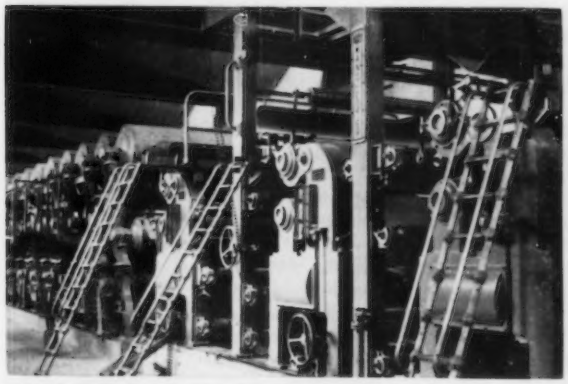
The machine drive is mechanical with a main drive shaft, section gears and cone pulleys with Extramultus type belts. The main shaft is driven by a General Electric variable speed d.c. 240 h.p. motor, which obtains current from a General Electric M. G. set with a synchronous a.c. motor, 300 h.p. d.c. generator and exciter unit.

The mill generates part of its power with a Westinghouse 2500 kw turbo generator, with one step extraction at 50 lbs. for the board machine. The turbine is supplied with steam by a Combustion Engineering 70,000 lbs. per hour boiler, generating steam at 425 p.s.i., superheated to 600°F. The boiler uses fuel oil with provision to change to gas. Feed water for the boiler is treated by means of a Cochrane hot lime Zeolite system.

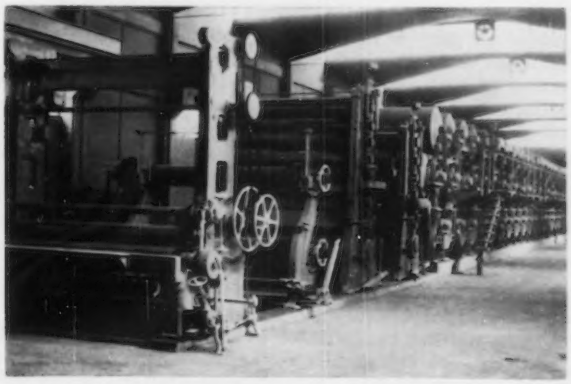
Water is obtained from two deep wells, both drilled to a depth of 600 ft., with a capacity of 57,000 gallons per hour each. The water is pumped to settling tanks, to remove heavy impurities and then it is pumped to a 13,300 gallon capacity, 115-foot high elevated tank.

The box plant has a new 87-inch Swift corrugating machine with a top speed of 600 feet per minute and a Universal take off for A, B, and C flutes. Three Hooper printers and an S & S Folder and Bostitch stitcher; one new S & S ZB Folder taper; one new die cutter, plus additional rebuilt equipment are installed.

The men responsible for the design, layout and installation of this new plant are: Hans Bettschen, Jr., project manager; Martin B. Keller, assistant project manager; Ramon Guerin, construction superintendent; R. A. Whitehouse, box plant superintendent; Victor Vargas, electrical superintendent.



Three baby presses and three plain presses.



Winder, reel, calender and dryer section.

Corrugated box plant area includes a new Swift 87-inch corrugating machine.

M. B. Keller, R. Whitehouse, H. Bettschen, V. B. Vargas and C. Monroy.

A Fresh Look at Paper Machine Stock and White Water Systems

Everyone from papermaker to paper machine designer will find something of interest in this article originally written as an introduction to papermaking for scientists.

It is impossible to appreciate the problems connected with the wet-end without some knowledge of white water and stock systems. In view of the great variety exhibited by such systems, this discussion will be limited to the inner white water circle comprising white water pit, fan pump, screens, cleaners and headbox. The handling of broke and excess white water will be omitted.

White Water Pit

The white water pit is often a circular tank lined with glazed tile placed at the side of the fourdrinier or underneath the breast roll. It receives white water drained from the table rolls plus as much of the seal pit water from the flat boxes as is needed to maintain constant level in the white water pit. It is imperative to keep the level of this pit stationary under all conditions, and no system can be considered acceptable where this is not done reliably by automatic controllers. Fresh water, however, should never be added to the white water pit in order to keep the level up, since this will cause most undesirable disturbances. When there is a white water deficit, fresh water should be added as far back in the system as possible, preferably in the tank for clarified white water. It should be borne in mind that the composition of white water generally varies depending on its origin. The filtering effect of the fiber mat on the wire increases with the distance from the slice, causing a lower fiber content in the white water. The filler content will vary too, but not necessarily at the same rate as the fiber content. The water from the flat boxes is much lower in fiber content than water from the table rolls. The design of the white water pit, therefore, should ensure adequate mixing of water from all inlets. If there is an overflow on the pit, this should preferably spill water originating from the flat boxes. The overflow should also remove any foam collecting on the surface. A trash catcher in the pit, where heavy objects can settle, will save the fan pump from damage and eliminate one source of trouble. The rate of flow in the white water pit and adjacent channels should be 1.0-1.5 f.p.s., a range that ensures smooth flow without settling or harmful turbulence. In the well of the white water pit, where the water sinks down towards the outlet, a flow rate of 0.5 f.p.s. will enable the large air bubbles to move to the surface against the direction of flow.

Figure 1 shows the design of a good white water pit. The air content in the white water pit can be considerable. Quantities from 3-6 per cent have been reported. (4) This air is harmful because it results in foaming and fiber flotation but also because of the effect it has on the fan pump. Even if the pump is adequately vented, variations are caused by the effect of the air content on the static head. Proper design of the downspouts from the wire trays and of the pit itself will go a long way towards reducing this trouble. (7) The pipe connecting the white water pit to the fan pump should have a smoothly rounded connection to the pit in order to obtain a low and stable exit pressure loss. It should not be too short.

Stock Addition

Stock is normally added to the white water ahead of the fan pump so that proper mixing can be achieved by the latter. It is very important that a homogeneous blend of constant consistency results. Since the stock generally flows by gravity from an elevated stuff box, the rate of flow will vary with the piezometric head at the point of introduction of the stock into the white water. It is therefore often preferred to add the stock to the white water pit just ahead of the pipe to the fan pump. With low velocity, constant pit level and constant air content in the white water, the piezometric head will then be constant at the point of stock addition. Improper stock introduction to the white water pit, however, may cause insufficient mixing of stock and white water and therefore basis weight variations. From a piping standpoint, also, it may appear better to put the stock pipe on the suction line ahead of the fan pump. If the

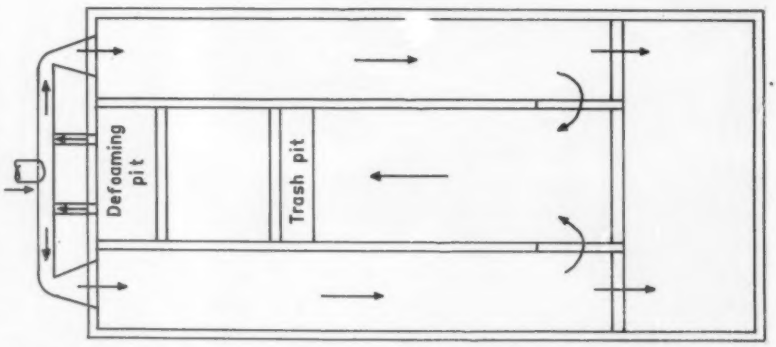


FIGURE 1. WHITE WATER PIT with trash pit and defoaming pit. The foam is sucked into eductors in the lines carrying seal pit water to the white water pit.

stock enters through a straight tee there will be better mixing but more turbulence than if the stock is introduced in the direction of flow, and opinions differ as to the best solution. On very large machines, white water may be injected into the stock line to predilute the stock before it is mixed with the bulk of the white water. Hydrodynamic investigations of this problem are needed.

The velocity in the stock line should be fairly high, 10-15 f.p.s. in order to get the most stable conditions of flow. The valve controlling the flow should preferably be a V-port valve sized correctly for the flow anticipated and placed as far down as possible in order to reduce the effect of variations in level at the stuff box and give reliable flow control. The stuff box should be placed so high above the level of the white water pit that negative pressure does not exist at the control valve. Fifteen feet has been mentioned as a rule of thumb for high speed paper machines.

Fan Pump

The fan pump must be able to produce a constant, that is, non-fluctuating pressure within the whole anticipated range of flows. Pump head and rate of flow should preferably be varied independently. This necessitates a variable speed drive and a careful selection of pump characteristics. It is advisable to select a maximum head about 50 per cent in excess of the maximum line pressure needed. Excessive pump head has to be throttled with valves at great power cost. Also, such throttling is liable to cause hydrodynamic difficulties. (7) A double suction fan pump with staggered impeller has been claimed to be particularly suitable for this application. (9) On paper machines, where the rate of flow has to be varied over a wide range, means should be provided for altering the pump speed. A magnetic coupling has found use as well as various variable speed d.c. motors. There are also pumps which are controlled mechanically by an adjustable sleeve inside the housing. The demands on the stability of any such control system are of course very high.

In some installations, one may find a bypass with a throttling valve between the pressure and suction sides of the fan pump. This arrangement enables control of pump head with a comparatively small and inexpensive valve. On modern high speed machines the system is, however, liable to introduce pressure fluctuations and instability and it is therefore not recommended. At any rate, the flow through the bypass should not be allowed to exceed 10 per cent of total flow.

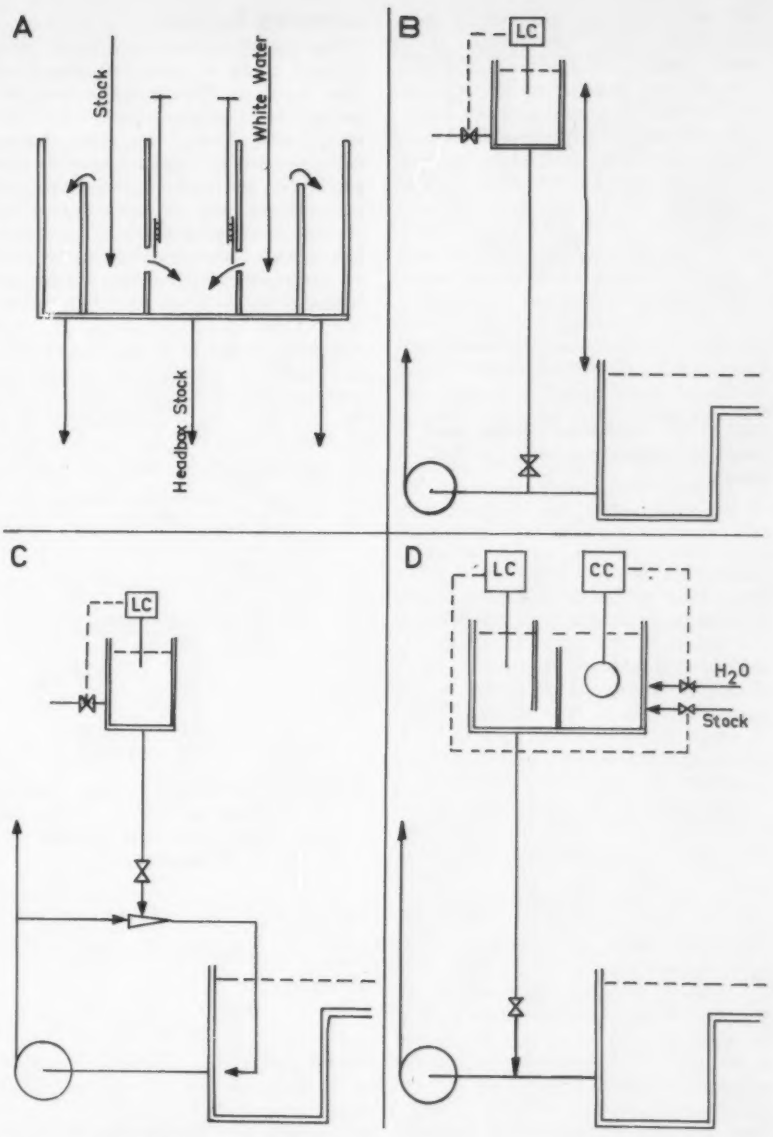


FIGURE 2. STOCK SUPPLY SYSTEMS

A—Hole in the wall system used on many small machines but not very accurate.

B—Conventional stuff box arrangement with level control of stuff box.

C—Stuff box system with predilution of stock in eductor and stock addition to the white water pit.

D—Stuff box with both level and consistency control. The latter may be reset to take care of minor changes in basis weight specification.

Piping System

The pipe lines between white water pit and headbox should be sized to give velocities of 4-8 f.p.s. At velocities below 2 f.p.s. slime accumulation and settling of stock may occur. High velocities on the other hand will instigate pressure fluctuations. Bends, tees and valves will be far more harmful at high velocities. At velocities below 10 f.p.s., suspended air has a tendency to accumulate in the pipes building up pockets which result in mass flow surges as well as slime growth. For this reason, it is recommended to slope all lines 1½ inches per foot upwards in the direction of flow, so that the air bubbles are carried along without building up anywhere. Vents should be put in where accumulation can be anticipated, for example at down bends.

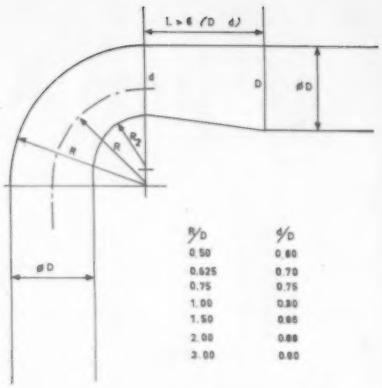


FIGURE 3. HYDRAULIC BEND, used in order to reduce separation of flow in bends.

In order to avoid large scale turbulence long and smooth bends should be chosen. Where a short bend is unavoidable, it may be advisable to resort to a special hydraulic bend, which is specifically designed to reduce the risk of separation. Figure 3 gives an example of such a bend, which is installed on a paper machine headbox and performing very well.

The opinion is sometimes heard that sharp bends and similar obstructions to flow contribute to the mixing or homogenization of fiber suspensions. The author knows of no experimental evidence to this effect. On the other hand, the harmful effect of such bends has been reported. (7)

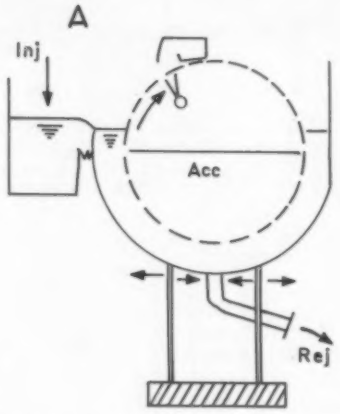
If at all possible, tees should be avoided. Where a splitting of the flow is necessary, it is preferable to use a manifold with a number of branch pipes. The harmful effect of the tee is because it is most unlikely that the flow at any moment will be split into two absolutely equal halves. Since water is incompressible the result will be different pressures in the two branch pipes and fluctuations which are further augmented by eddies moving down the pipe to the tee, where they will continue into the branch pipe having at the moment the lowest pressure. The troubles are reduced if large scale turbulence is avoided ahead of the tee and the tee itself is sized for a rather low velocity—say 5 f.p.s. Hydrodynamic streamlining of the tee has been tried with little success.

Screens, pumps and cleaners should be so placed that the length of the pipe lines is kept at a minimum. Of course, non-corrosive and smooth pipes should be chosen for this application. The hydrodynamic principles governing headbox piping are dealt with later.

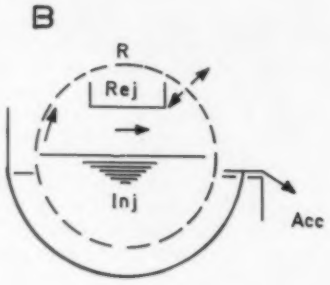
Screening Systems

On most paper machines the diluted stock is screened ahead of the headbox. The screens are expected to remove shives, strings, lumps and foreign objects. Nowadays, however, shives and dirt are efficiently removed in the pulp mill in complete and elaborate screening installations and the role of the headbox screen is largely reduced to that of a strainer for foreign objects or lumps of slime. Even so, the performance of the screens may make all the difference between good and poor machine operation, modern high speed machines becoming increasingly sensitive to sheet imperfections at the wet end.

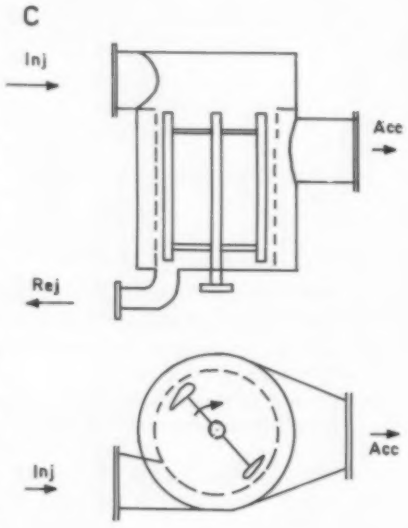
The typical paper machine screen was until recently a slotted plate, vibrating, rotary screen with flow outside in—usually known as the Bird screen, although the same type of screen is made also by other manufacturers. The screen plates are kept



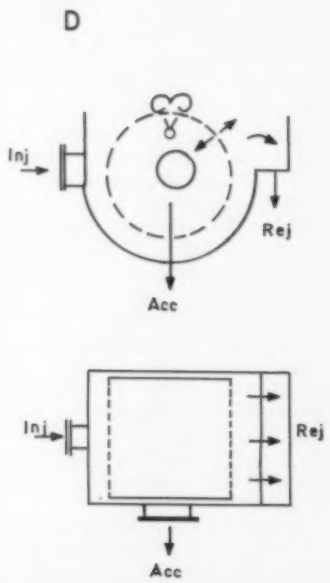
A—Rotating slotted screen drum. Vibrating vat. Flow: outside—in. Rejects out with shower water and through bottom drain of screen vat.



B—Rotating, vibrating, slotted screen drum. Flow: inside-out. Rejects out only with shower water.



C—Enclosed screen. Stationary, perforated screen drum. Rotating vanes inside drum. Flow: inside-out. Rejects out through bottom drain. No showers.



D—Rotating, vibrating slotted screen drum. Flow: outside-in. Rejects out through overflow and with shower water.

FIGURE 4. PAPER MACHINE SCREEN TYPES.

open by high pressure showers inside the screen drum, which wash the impurities sticking in the slots out into a tray, from which they normally go to the sewer, giving an insignificant fiber loss. Heavy impurities, however, tend to accumulate at the bottom of the screen vat, and it is therefore recommended to withdraw about five per cent rejects from the bottom of this vat and to rescreen the rejects on a vibrating flat screen or in a centrifugal cleaner. For economic reasons, only a very low loss of good paper making fiber can be tolerated in rescreening the rejects.

Two of the most common reasons for poor screen performance are inefficient shower pipes and insufficient withdrawal of rejects. The screen plates, too, need careful watching. On many machines every lump or string that passes through the screens means a wet end break. A missing bolt, therefore, may be sufficient to upset the paper machine. The gradual widening of the slots has to be followed and plates replaced in time. Plastic coated plates (Lithcoted) are used as an economic alternative to stainless steel plates. The plastic coating stands up very well to wear and greatly reduces the plugging tendency. The smooth edges of the coated slots, however, make it easier for shives to pass through and a slightly narrower slot should therefore be used—say 0.002 inch less. The thickness of the coating, which is also advantageously applied to old, worn out bronze plates, is about 0.005 inch.

One disadvantage of the type of screen described is that it entails large open trays, vats and channels, which have to be showered with fresh water to reduce foaming. Even so, foam usually builds up in corners and lumps of slime are formed especially at the water line. Splashing and mist can seldom be avoided. For these reasons a new screen type has lately become quite popular. The screen is fully enclosed and the stock is pumped right through it at the pressure existing in the pipe line. The screening device is a perforated, stationary drum, where the holes are kept clean by wings sweeping past and creating alternating pressure and suction in the holes. Advantages claimed are no need of fresh water showers, easy cleaning and reliable operation. The floor space needed is moderate and screen vats are eliminated. Rejects are sluiced out and rescreened in ordinary fashion.

In spite of these advantages the enclosed screens have met opposition from the strict adherents of slotted screen plates, and it may be true that they do not match the slotted plate screens when it comes to really rigorous screening.

Because of the absence of air-water interfaces a system featuring enclosed screens will be quite sensitive to hydraulic pressure waves. For this reason extreme care is advised in designing the installation. The piping rules presented above should be strictly adhered to. The rotation of the vanes inside the screens may be de-synchronized so that the vanes do not all pass the inlets or outlets simultaneously. It is easier, however, to increase the number of vanes from two to three or four. Venting and reject withdrawal should be so arranged that pressure surges are not created by these operations.

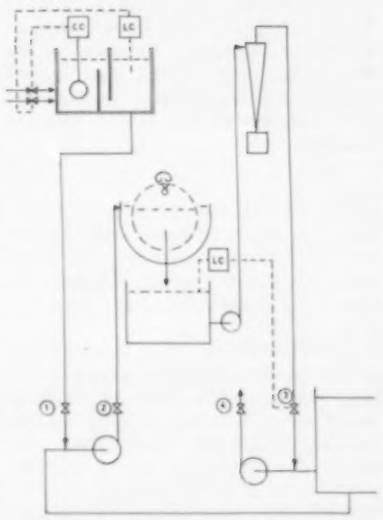


FIGURE 5. KRAFT MACHINE SCREEN SYSTEM. The stock is diluted from 3 per cent at the stuff box to about 1 per cent and screened at this consistency. It is then pumped through centrifugal cleaners and diluted to about 0.2 per cent at the fan pump.

On kraft machines screens are often omitted, or the stock is screened at about one per cent consistency in high frequency slotted screens and then diluted with white water to headbox consistency thereby greatly reducing the screen capacity needed. It is believed, however, that also on kraft machines an installation of enclosed screens ahead of the headbox is a sound investment.

Centrifugal Cleaners

In many cases the most harmful impurities in the headbox stock are not removed by screening—being heavy and of very small particle size. Such impurities, coming from the fresh water, the pipe lines, the grinder stones or from fillers used, are apt to deposit on the flat box covers causing rapid failure of the wires. On coating machines the grit may be picked up from the paper by the coating rolls and firmly lodged on these rolls only a few grits are needed to ruin the production. Calenders are also sensitive to grit in the paper as are the printing presses.

For these reasons, most paper machines making quality paper are equipped with centrifugal cleaners placed between the fan pump and the screens. These paper machine cleaners are no substitute for the cleaners in the pulp mill but constitute an added safeguard. Generally, the rejects from the cleaners have no economic use and must therefore be kept to an absolute minimum. On the other hand, few machines are large enough to make more than three cleaning stages feasible and even that leads to a fairly complicated system.

Sometimes the third stage rejects from all machines are combined and cleaned in a fourth stage. Although cleaner types with continuous reject bleed are generally considered most efficient (no statistical comparison is known to the author), the cleaners with dirt collection boxes are very popular with paper makers since they give practically no fiber loss and call for very little attention from the machine crew. The continuous bleed cleaners, however, have lately been equipped with new reject nozzles eliminating the sucking of air into the stock and the risk of plugged nozzles at the same time greatly reducing the amount of rejects. Another method is to connect all reject tips to a tank which is kept under vacuum by a Nash pump. The system is claimed to reduce the air content of the stock thereby improving drainage but it entails a considerable increase in installation cost, especially on small machines. Probably any type of cleaner will do a good job if it is in proper condition, correctly installed and operated according to instructions. This is by no means always the case. The importance of a high and constant pressure drop is often overlooked. Regular inspection is needed in order to reveal and replace worn and eroded parts, which greatly reduce the efficiency of the units—presumably by creating a turbulence whereby the reject layer at the wall is disturbed. Plugging of reject nozzles must be prevented in view of the fact that a plugged cleaner will pass 100 per cent of the dirt with possibly disastrous results at the paper machine.

Deaeration of Stock

The free air in headbox stock may amount to as much as five per cent by volume. It causes much trouble such as foaming, fiber flotation, slime growth and consistency fluctuations. Most of the headbox air bubbles out before the stock reaches the slice, but there is generally enough left to exert considerable influence on drainage and sheet formation on the wire. Experiments have demonstrated that the last 0.1-0.2 per cent air is very difficult to remove, consisting of minute air bubbles adhering to the fibers or filling the lumen. A simple calculation reveals that in headbox stock of 0.5 per cent consistency. 0.2 per cent air has a volume equal to 50 per cent of the fiber volume and lowers the apparent specific density of the fibers from 1.46 to 1.0. The effect of this residual air on drainage through the fiber mat and on the suction at the table rolls has been demonstrated. **(3)** Two methods have been developed for removing air from headbox stock. In one method the stock is pumped through centrifugal cleaners, which are evacuated through the reject openings. In this way most of the free air is removed and many of the difficulties caused by air are eliminated. The deaeration, however, is not efficient enough to remove the residual air, which will continue to influence the drainage on the wire.

A more efficient but far more expensive method is associated with the trade name Deculator. The Deculator is a large evacuated tank into which the headbox stock is sprayed. The vacuum is kept sufficiently low to make the stock boil thereby removing all traces of air suspended or dissolved.

Deaerated stock has a very distinct appearance. In the absence of turbulence, the fibers rapidly sink to the bottom leaving a clear, foam free layer of water at the surface. The fibers do not adhere to one another and the fiber flocs are very easily broken up. On the wire, deaerated stock appears smoother and there is less spraying from the table rolls, (spouting). The vacuum usually increases a couple of inches at the couch and the porosity of the paper decreases. Open headboxes can be operated without showers.

Although for these reasons deaerated stock is easier to process, drains faster and gives a better formed sheet with improved printing qualities, it is very difficult to assess the value of these various improvements. Where quality is not critical and the machine capacity is limited by drying or drive rather than drainage, deaeration probably will not pay for itself. However, it may be wise, when designing new installations, to take stock deaeration into consideration.

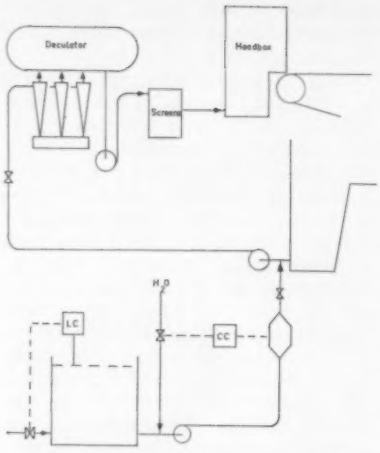


FIGURE 6. COMPLETELY CLOSED STOCK SUPPLY SYSTEM. The stock is pumped from the machine chest directly through an in-line consistency regulator to the fan pump. The diluted stock passes through centrifugal cleaners, a Deculator and enclosed screens to the pressure headbox.

The Deculator is placed after screens and centrifugal cleaners. In one arrangement the centrifugal cleaners are mounted directly on the Deculator thereby eliminating one pump. **(6)** Figure 6 shows a completely closed stock supply system, suitable for large paper machines, where the stuff box has been eliminated. The stock is pumped from the machine chest directly to the suction side of the fan pump and the basis weight is controlled by a regulating valve in the stock line. The system will function satisfactorily provided the regulating valve is placed below the level of the white water pit, and a negative pressure on the downstream side of the valve is avoided. Of course, a regulator of high quality, properly adjusted is a prerequisite.

Wet-End Instrumentation

A paper machine cannot be operated really efficiently unless all disturbances to the white water system can be immediately observed, traced and corrected. Below, some examples are given of instruments used for this purpose.

The vacuum gauge on the couch is perhaps the most useful instrument at the wet end. It is strongly recommended to add a circular chart recorder at this point. A study of this chart gives reliable information on changes in basis weight, freeness and other factors affecting drainage. Similar recorders on the flat boxes are not quite so important but may still be useful. For example, the flat box charts will reveal flooding or improper levelling of the boxes and provide a check on the vacuum used on the various boxes. This vacuum is often not controlled closely enough, which is not surprising where the gauges are placed at the drive side of the paper machine. Level recorders on headbox, couch pit, white water pit and seal pit will greatly simplify the supervision of the paper machine. Without such recorders disturbances caused by fluctuating levels in one or more of these pits are very hard to observe and correct. Level controllers are always helpful but not as essential as the level recorders.

The metering of stock into the white water system has to be under perfect control. Generally the stock flows from a stuff box through a throttling valve into the white water ahead of the fan pump. On most installations the stuff box level is maintained by an overflow line back to the machine chest. This overflow, however, upsets freeness and consistency control and the line is easily fouled by slime. A level controller actuating a valve in the access line to the stuff box is a far better solution. A consistency regulator may be installed in the stuff box, but dilution water should then be added right at the stuff box to prevent hunting. The opinion is often heard that consistency controllers in this position are too close to the paper machine and therefore more harmful than helpful. Properly installed and adjusted controllers, however, may do an excellent job at the stuff box provided that they have been preceded by efficient consistency controllers earlier in the stock system.

The basis weight of the sheet is controlled by a valve in the line from the stuff box. On large machines this valve is driven by a servomotor controlled by push buttons in some convenient location. The servomotor can also receive its impulses from a Betameter at the dry end of the paper machine. This calls for a very good reset and damping mechanism to avoid hunting. This system is used on an increasing number of paper machines and has been found especially attractive on machines where basis weight or color are frequently changed. It makes it possible, for example, to empty the machine chest without losing control of the basis weight. The main disadvantages—

high cost and expensive maintenance —are being gradually reduced by the advance of technology.

A remaining but not necessarily decisive objection to Betameter control is that it may lead to neglect of consistency and level control in the white water system so that in the end the operation will be less stable than without Betameter control. This, however, is more a matter of discipline than of technology.

The acidity of the white water may be controlled automatically by the addition of a solution of alum at a rate set by a pH-controller installed in a shunt line after the fan pump. The glass electrode of the pH-instrument, however, needs regular cleaning and is comparatively delicate. As a rule, a simple pH-recorder will enable the machine operators to keep the pH constant by manual control. Faults in the recorder are easily detected by a daily check and can often be suspected already from the shape of the pH-curve.

The speed difference between the wire and the first press—usually of the order of four per cent—is another operating variable which should be recorded. The reason for this is that although it is easy to see when the draw is too slack, it takes considerable skill and attention to avoid too tight draw. As a consequence, many breaks at the couch can be avoided by a recorder that shows what the speed difference is and prevents a setting according to individual judgment which may result in different draw for each shift. A sensitive draw recorder also becomes a valuable indicator of drive troubles, for example line frequency variations. It has further been found that the draw recorder shows changes in pulp quality. Thus pulp with lower wet strength will necessitate a higher draw at the couch and vice versa. An increased adhesion between sheet and wire for example because of lower moisture content will have to be met with an increase of the draw.

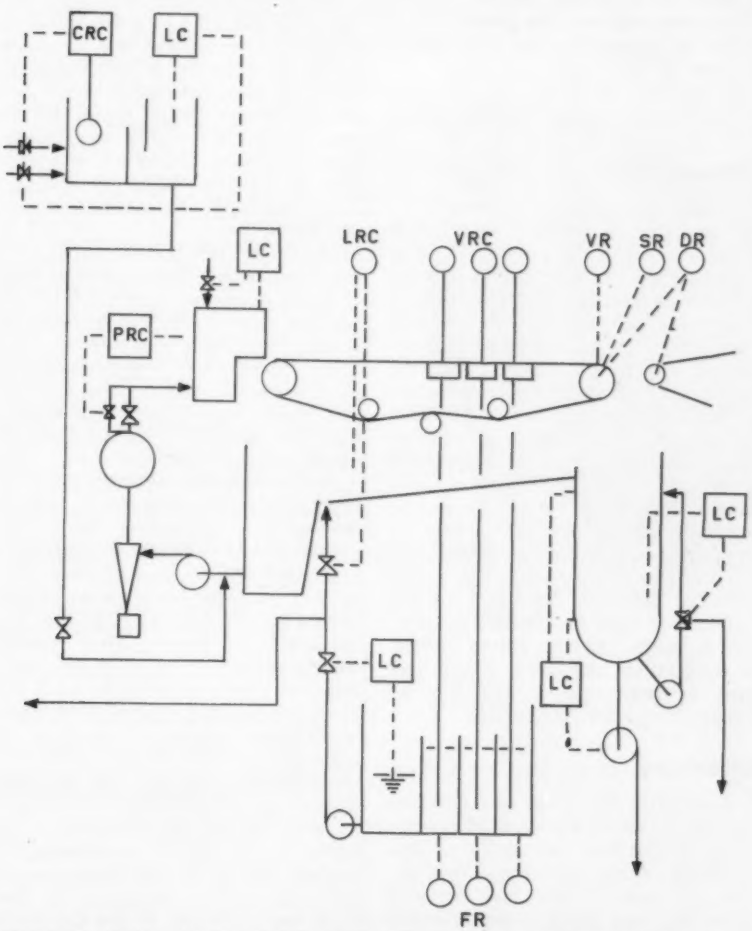


FIGURE 7. PAPER MACHINE WET END INSTRUMENTATION—CRC—Consistency recorder controller; LC—Level controller; VRC—Vacuum recorder controller; SR—Speed recorder; DR—Draw recorder; PRC—Pressure recorder controller; FR—Flow recorder.

The only really satisfactory type of draw recorder known to the author makes use of small gear wheels mounted on the shafts of the drive motors. The number of teeth on the gear wheels passing a given point are counted magnetically or otherwise, and a speed difference is obtained by electronic subtraction of the counts from two machine sections. Total speed is obtained by the incorporation of quart-crystals with fixed frequencies as references. Since this type of instrument records only the difference between two speeds or when total speed is concerned—the difference between the measured frequency and a known frequency of about the same level, the accuracy of the instrument is independent of total speed. At 100 f.p.m. or at 2000 f.p.m. a speed difference of 0.5 f.p.m. can be detected.

The Headbox

The function of the headbox is to spread the pulp suspension evenly across the paper machine. It may sound redundant to state something as obvious as this, but it may be quite useful to keep this simple truth in mind when one is confronted with a new headbox design. Quite often headboxes appear to be designed primarily to overcome trouble that they themselves introduce. Flocculation, cross currents, turbulence and slime deposits are all in the first place results of poor headbox performance, and even if the headbox can be made to eliminate the effect of these disturbances on sheet formation, it has really performed nothing but the spreading of the stock.

Flow Spreading

The stock is delivered to the headbox by a pump or by gravity at consistencies varying from about 0.15 to 1.2 per cent according to the grade of paper and the wire part of the machine. On all modern machines the stock is introduced through a pipe sized for a velocity high enough to ensure a minimum of settling and slime growth. In the following section, examples will be given of the many ways in which the stock from this pipe is spread across the width of the headbox. It shall only be remarked here that on this point headbox manufacturers in general have been remarkably unsuccessful. Considering the enormous loss of time and production entailed in mill scale experimentation it is surprising that so little influence of hydrodynamic research can be detected in this work. It is hard to understand why such a well known hydrodynamic process as

flow spreading should offer so much difficulty to paper makers, unless the explanation is that the problem has been treated as a specific paper making problem. As a consequence, good flow spreading, which should really be the main concern of headbox manufacturers, has been regarded as a more or less impossible proposition and all efforts have been concentrated on eliminating the effects of the disturbances introduced by poor flow spreaders. In contrast, a really good flow spreader will make the headbox proper almost superfluous. Such a spreader should inject the stock into the headbox with an even velocity distribution across the box and negligible velocity components in the cross direction at any point. The flow should be steady and fast enough to prevent settling, and the turbulence of the stock should be of a low scale but intensive enough to prevent flocculation in the headbox for the time it takes the stock to pass through it. The headbox then only has to impart the right velocity to the stock issuing from the slice.

Flow Evening

As mentioned above, almost all headboxes have—because of their poor flow spreaders—to be designed primarily to even out the streaky and turbulent flow from the spreader. The explosion chambers, tapered ducts, rotating perforated rolls, vanes, baffles and other devices all serve this purpose. Flow evening first of all means a merging of the individual streams from the flow spreader inlets or a straightening out of the velocity profile from flow spreader slots. This is no simple problem in itself, but the real trouble comes from independently fluctuating velocities across the headbox. These fluctuations result in cross currents, which must under no circumstances persist to the slice. On the other hand, if the cross currents are stopped altogether but not the velocity fluctuations, the velocity profile at the slice will be just about as bad as after the flow spreader. Consequently, pressure variations must first be given a chance to equalize across the headbox and then the cross currents must be stopped ahead of the slice. This later object is usually achieved with straightening vanes—open or inside perforated rolls.

The headbox should also provide as much damping as possible of hydraulic pressure waves and mass flow surges from the flow spreader—a very intriguing hydrodynamic problem.

The editors of Paper Trade Journal were exceptionally fortunate to be offered the manuscript of "A Monograph on Paper Machine Wet Ends" of which this article constitutes the first section. Designed as a textbook on the wet end of the paper machine for young engineers and technologists it contains much valuable information for all our readers and it was decided to publish four of the five sections in Paper Trade Journal prior to printing as a monograph. The remaining chapters cover: Headbox Designs; Forming Boards, Table Rolls, Flat Boxes and the Dandy; Paper Defects Traceable to the Wet-End; and Trouble Shooting at the Wet-End. Because of the comprehensive coverage given in Paper Trade Journal by three articles this past summer on headbox design, this chapter will not be published in the magazine but will appear in the book.

Deflocculation

A headbox designer, who has made up his mind to achieve perfect flow evening, is apt to end up with a very large headbox containing a number of flow evening devices. This does not always mean even flow since secondary troubles, for example channeling, may result. Fiber flocculation will be an almost unavoidable consequence. Unfortunately, it is so much easier to let flocs form than to break them up. Acceleration underneath baffles or through perforated rolls may reduce flocculation to manageable proportions but the effect is neither good nor lasting. If the stock has been completely deaerated under vacuum, however, there are no air bubbles to hold the fibers together, and a gentle stirring action suffices to deflocculate the stock. Fiber flocs are the main reason for mottled paper and cloudy formation.

Cleanliness

A headbox that gives serious slime trouble is worthless even if it produces a perfect flow pattern. The problems of cleanliness and flocculation are related but not identical since they may occur either together or one at a time. While flocculation is caused only by lack of turbulence, slime trouble may have many explanations. Examples are rough finish of wetted surfaces, dead corners, stagnant ponds, foam accumulation, settling of fiber or filler and catching of fibers on rotating rolls or other obstructions to flow. Certain stock characteristics, such as high air content, long fibers, high ash content or sticky constituents make the headbox especially susceptible to slime accumulation. Headbox features that are normally acceptable have to be avoided under such conditions. Examples of such features are wetted surfaces facing downwards and stationary perforated plates. Much practical experience is needed to avoid building "slime traps" into a headbox design.

Jet Formation

The stock is ejected through an adjustable slot or slice onto the moving wire on which the sheet is formed. A good headbox is expected to have means for controlling the width, angle and velocity of the jet issuing from the slice at any point across the machine. The jet also must be stable, that is, the turbulence in it should be so low that the jet is not broken up before it hits the wire. The velocity profile through the jet should for the same reason have "plug flow" shape. How to achieve all this is still a problem, and in the following chapters some very contradictory opinions are presented.

Maybe too much is expected from the slice, especially as a flow evener. It is believed that in the ideal headbox the slice should not be adjusted locally since this is bound to cause cross currents and permanent deformation of the top lip. In practice, such adjustments are still needed, but they should be regarded as the absolutely last resort.

In this connection, it may be appropriate to consider the control of the overall slice opening. If, for example, a lower headbox consistency is desired for reasons of sheet formation but speed and basis weight should remain constant, the top slice is raised. Of course, after moving the lip one has to admit more or less headbox stock in order to keep the headbox level constant. The basis weight may be momentarily upset by these changes but returns to the previous level after a few minutes. There may, however, be a slight permanent change if the closeness of the white water system is changed by the alterations. Basis weight corrections are made by adjusting the flow from the stuff box. If the top lip is difficult to set accurately, as frequently is the case on old paper machines, paper makers may adjust

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headbox consistency by raising or lowering the level in the headbox. This should be looked upon as an expedient, since it is not good paper making. If the headbox level is changed in order to get a more suitable jet speed the slice setting should also be changed so that flow rate and consistency remain constant.

(The next article will discuss table rolls, forming boards, flat boxes and the dandy. Due to the recent extensive coverage given to the subject of headbox design in *Paper Trade Journal* the section on this is being omitted here but will be included in the book.)

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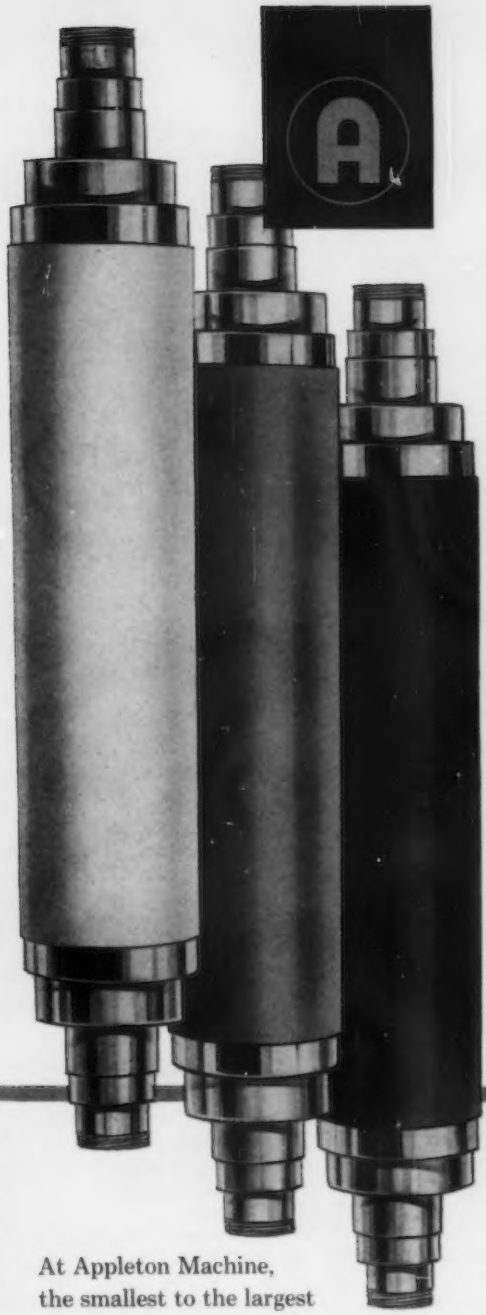

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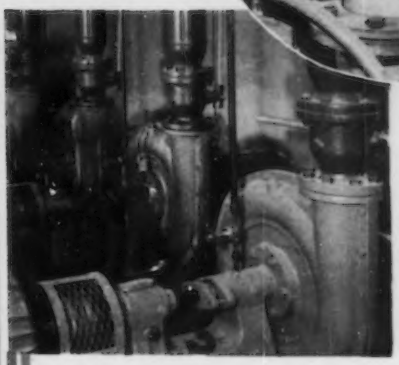

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PJT NEWS OF SUPPLIERS

AERIAL VIEW of new Albany Nordiska de Mexico felt plant near Cuautitlan, Mexico. This is Mexico's first paper machine felt mill.

Albany Felt Co. has announced that production of paper machine felts for Mexico has commenced at a new $2,000,000 plant near Mexico City.

The plant, known as Albany Nordiska de Mexico, S.A. de C. V., is a joint venture of Albany Felt Co. and Nordiska Maskinfilt Aktiebolaget of Halmstad, Sweden. Albany is the major investor.

This plant will make felts in size and quantity to meet any foreseeable needs of the Latin American trade. It was formally dedicated in ceremonies held November 11 before 300 guests.

Attending were Mexican governmental dignitaries, manufacturers and suppliers as well as representatives of Albany Felt Co. and Nordiskafilt.

The plant is equipped with modern machines from the United States, Canada, Sweden, Switzerland, West Germany and Mexico.

All manufacturing processes from the selection and inspection of raw wool, through scouring, blending, spinning, weaving, joining, fulling, and other finishing operations will be handled at the mill. The same rigid quality control standards adhered to at all Albany Felt Co. plants will be maintained at the new plant.

Shawinigan Resins Corp. has announced the appointment, effective December 1, of Van Waters and Rogers Co. of Dallas as the company's sales agent in the state of Texas.

In announcing the appointment, E. H. Finsilver, Shawinigan's general sales manager, stated that the Van Waters organization will handle the sale of Shawinigan's entire product line of polyvinyl resins and emulsions.

Van Waters, with headquarters in Dallas, also maintains offices in Houston and other Western cities and is well known throughout the West as an agent for industrial chemicals and raw materials.

Manchester Machine Co., wholly owned subsidiary of Diamond National Corp., named Gex P. Condit president. Mr. Condit graduated from Yale University in 1946 with a degree in engineering and later received his master's degree in business administration from Xavier University.

Before joining Diamond National in 1950 as an industrial engineer, Mr. Condit was with the National Tube Co., a division of U. S. Steel. Mr. Condit has moved up through Diamond National through a variety of supervisory and executive positions. He has been assistant to the vice president of Diamond's Molded-Packaging Division, manager of Custom Contoured Products and, most recently, special assistant to the general manager of the Diamond Match Division.

As president of Manchester he succeeds Thomas A. Jones who has resigned, to take a position as vice president and director of Ethicon, Inc., a wholly owned subsidiary of Johnson & Johnson.

General Aniline & Film Corp., Binghamton, N. Y., has appointed Harold C. Harsh general manager of the Ansco Division, according to an announcement by Leopold F. Eckler, vice president of the company and group executive in charge of its Ansco and Ozalid Divisions.

Mr. Harsh replaces Dr. Eckler as general manager of Ansco.

Mr. Harsh, who joined Ansco in 1934 as a chemist, was manager of operations for the division. Since becoming associated with the division he has served as a department head in its paper plant, manager of the chemical development laboratory, manager of quality control, production manager, and was named manager of operations in 1956.

J. A. Muir

A. J. Killeen

Huyck Felt Co., Rensselaer, N. Y., and Aliceville, Ala., has announced the appointment of two field service engineers: John A. Muir for Ohio, Kentucky and portions of Indiana, Pennsylvania, Tennessee and West Virginia; Allen J. Killeen for Colorado, Iowa, Kansas, Missouri, Oklahoma and portions of Illinois, Indiana and Wisconsin.

Mr. Muir, a graduate of Virginia Polytechnic Institute, has done considerable service work in paper mills throughout the country and has received extensive training in felt design, manufacture and application at Huyck's Rensselaer, N. Y., plant. In his new assignment he will be teamed with Ralph Prince, felt sales engineer, a veteran of almost 25 years with the paper industry.

Mr. Killeen, a graduate paper engineer from Lowell Technological Institute, has worked as a Huyck research engineer since 1957. During this time he used the Beta Ray Gauge

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in mills throughout the country to study press water removal efficiency. and worked closely with papermakers to improve overall felt performance. He will work with Bud Vogt, felt sales engineer, who was previously a Huyck field service engineer for several years.

Witco Chemical Co., Inc., announces the promotion of Rudolph Cubicciotti to administrative vice president.

In his new post, Mr. Cubicciotti will direct the planning and coordination of all activities that relate directly to future corporate growth. His responsibilities in this area extend to all Witco divisions, including Sonneborn Chemical and Refining Corp., Ultra Chemical Works, Inc., and Witco's tar products and Pioneer Products Divisions.

Prior to his promotion, he was vice president of Sonneborn Chemical and Refining Corp.—a wholly owned Witco subsidiary. He joined Sonneborn in 1943 and, before that, was product sales manager for Union Oil Co. of California. He is a graduate of the University of California with a B.S. in chemical engineering.

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Tennessee Corp., Atlanta, Ga., has promoted J. T. Parkerson, Jr., to the position of assistant general manager at its East Point plant. Mr. Parkerson, stationed in Atlanta, was a sales and technical service specialist on liquid sulphur dioxide prior to this promotion.

T. A. Day

C. L. Hoffman

Stanley Steel Strapping, division of The Stanley Works, New Britain, Conn., has announced two appointments in the sales department.

Theodore A. Day has been appointed assistant regional manager for the Chicago area. Charles L. Hoffman has been named sales training and market research manager in New Britain.

Mr. Day, former manager of market development, has been with Stanley Steel Strapping since 1955, beginning with inside sales. He has also served as sales representative in western Pennsylvania and up-state New York, working out of the Buffalo office.

Mr. Hoffman, former Stanley Steel Strapping sales representative in western Massachusetts and Vermont, has been with The Stanley Works since 1946.

Jefferson Chemical Co., Houston, Texas, has appointed Norman L. Case manager, market research, according to J. J. Glover, manager—Commercial Development Division. In his new position, Mr. Case will be responsible for the market studies on both new and existing products.

Prior to his affiliation with Jefferson Chemical, Mr. Case was a marketing research analyst with Monsanto Chemical Co. Previously, he had held positions with Diamond Alkali Co. and Merck & Co.

Hungerford & Terry, Inc., of Clayton, N. J., engineers and manufacturers of water conditioning plants for over half a century has appointed R. G. Weston New England sales manager. Mr. Weston, a graduate of Drexel Institute of Technology, was chief engineer of Hungerford & Terry, Inc., at Clayton, N. J., for many years and will be

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H. R. Myers has been appointed sales representative in the company's Northern Florida-Southern Georgia territory commencing December 1, 1960. Mr. Myers was New England sales manager for Hungerford & Terry for the past 30 years and takes a wealth of experience in the art of water purification to the Florida-Georgia territory.

Clupak, Inc., New York, N. Y., has just elected Dudley B. Smith secretary of the corporation. This announcement was made by G. E. Amerman, president, following the resignation of James F. Haley, secretary of Cluett, Peabody & Co., Inc., who has held the position of secretary of both corporations.

Mr. Smith who also holds the position of manager of foreign licensing, has been associated with the Clupak extensible paper project since 1955 when he was patent counsel for Cluett, Peabody & Co., Inc. (Cluett, Peabody is one of the two stockholders of Clupak, Inc.) A native of Portland, Oregon, Mr. Smith was in the private practice of patent law in that city, and a patent examiner in the United States Patent Office, before joining Cluett, Peabody.

Langston

LANGSTON Leadership by design

Samuel M. Langston Co., Camden, N. J., has adopted a new trademark, effective January 1, 1961, symbolizing the role of the company's machines in corrugating or slitting and winding paper and paperboard. Langston is a leading manufacturer of machinery for making corrugated shipping containers. The 60-year-old firm also produces slitters and winders used in papermaking.

The new trademark unifies four curves moving at right angles in the shape of a cross, each curve embracing a circular roll, thereby suggesting webs of paper.

Two former trademarks are replaced by the new symbol, one a cutterhead and shears, used since 1902 in connection with slitting and winding machinery; and another, a T-square and triangle used with the phrase, Leadership by Design, since 1955 for the corrugating machinery business.

Dewey and Almy Chemical Division, W. R. Grace & Co., Cambridge, Mass., announces that Fred P. Tarr of Stoneham, Mass., has joined the Organic Chemicals Division as a development engineer in the Process Development department.

He was formerly with E. I. du-Pont de Nemours & Co., Inc., as a project engineer, and has also served with Monsanto Chemical Co. as a development engineer and construction engineer. He received a B. S. in chemical engineering from the University of Maine in 1953, and an M.S. in chemical engineering from Maine in 1959.

Mr. Tarr will be engaged in design of equipment and plants for the manufacture of Dewey and Almy's latexes, emulsions and resins used in paints, paper coatings, adhesives, textile sizes, rubber products, and impregnated fiber products.

Hurletron, Inc., a Delaware corporation, has been formed through the merger of two leading Illinois manufacturers of electronic and mechanical components and automatic controls according to Thomas N. McGowen, chairman of the board of the new company.

The merger combines the assets, personnel and engineering facilities of Electric Eye Equipment Co. of Danville with those of the Wheaton Engineering Corp. of Wheaton. These firms now become divisions of Hurletron, Inc. In addition to the division offices, Hurletron will also maintain offices at 135 South La Salle Street, Chicago, Ill.

While both firms manufacture electronic and mechanical components and automatic controls, they have served widely divergent markets up to the present time. Electric Eye provides precision automatic controls for application in the graphic arts, paper making, professional motion pictures and other industries; Wheaton has made important contributions to electronic and mechanical time delay devices and components for space age applications for the Government and the military. Electric Eye has just recently completed a 12,000 square foot addition to its present building in Danville to accommodate engineering and manufacturing of the new Hurletron DC Press Drive for high-speed printing presses. The new addition brings the total square footage to 35,000. More than 140 people are employed in this division.

Wheaton Engineering is constructing approximately 8,000 additional square feet to its building in Wheaton to house a qualification laboratory and provide additional

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OR MADE TO YOUR
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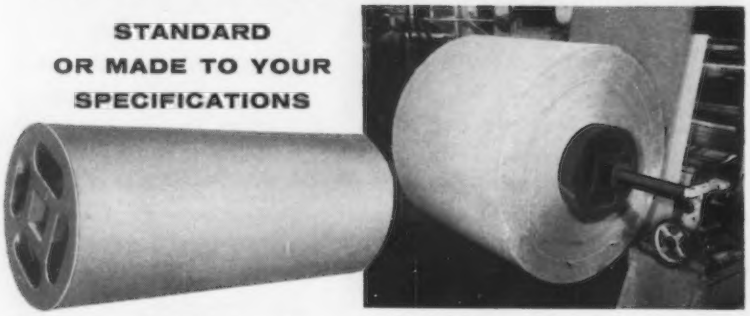

The permanent winding core for paper mills, converters and printers featuring

- **Permanent welded construction**
- **Heavy gauge steel center tube**
- **3/16-inch steel end-plates and flanges**
- **1/4-inch hard vulcanized fibre shell**
- **Easy chucking arrangement**
- **Core of standard or special diameter**

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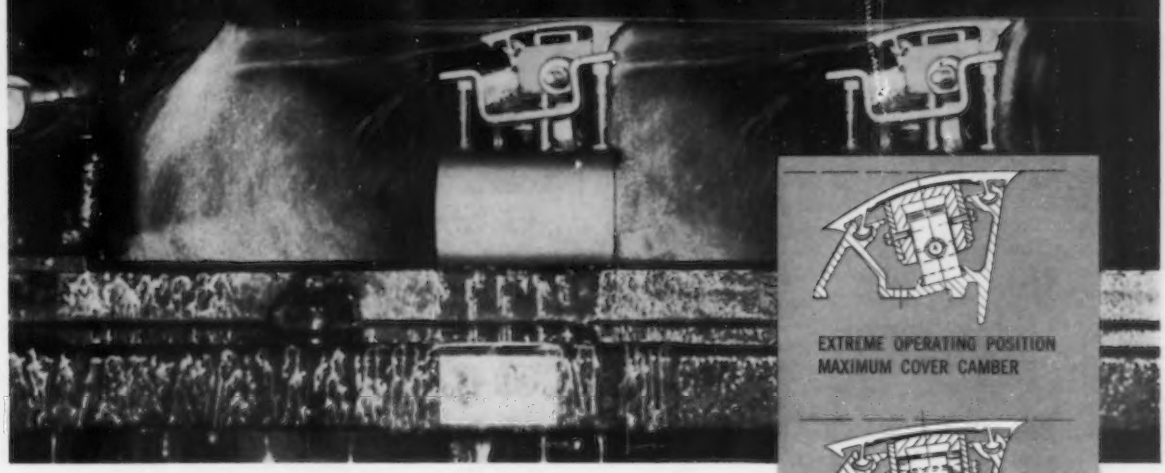
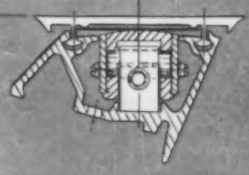
Improved Sheet Formation — Controlled Drainage

with the NEW LODDING Wire Doctors



EXTREME OPERATING POSITION
MAXIMUM COVER CAMBER

TYPICAL OPERATING POSITION
MODERATE COVER CAMBER



CAM MECHANISM RETRACTED
COVER CHANGING POSITION

DISRUPTIVE PRESSURE RIDGES, WIRE SAG AND SNAP BACK — obstacles to good sheet formation — are eliminated where table rolls are replaced with Lodding Adjustable Fourdrinier Wire Doctors. Wet streaking and worming of the sheet caused by table rolls disappear. Improved formation results.

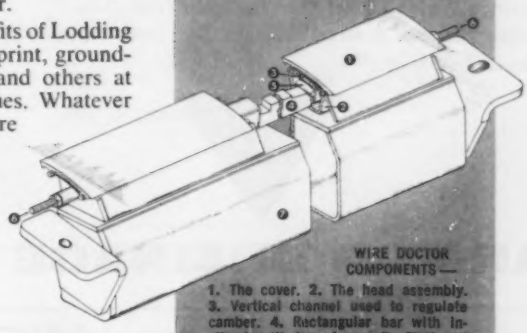
Optimum wire drainage is achieved by adjusting the Wire Doctor cover. The camber of the cover, height and tilt of the Wire Doctor are easily adjusted while the machine is operating.

With Lodding Wire Doctors available, drainage area is utilized far more than is possible with table rolls. Improved productivity — increased production — result.

Lodding Wire Doctors consist of a semi-rigid, extruded cover, a standard size head assembly (designed to position the cover vertically and regulate its camber) a support beam and mounting brackets.

The Fourdrinier wire is supported by the cover, which doctors excess water from the underside. Also, the cover induces drainage through a vacuum created between the wire and the cover.

Many progressive papermakers are reaping the benefits of Lodding Wire Doctors on machines making glassine, book, newsprint, groundwood specialties, tissue and light weight fine papers and others at speeds of 100 to 2000 fpm, at widths up to 276 inches. Whatever stock you are running, it will pay you well to learn more about this proven way to increase the productivity of your Fourdriniers. Send today for Bulletin No. 6005. It describes the Lodding Adjustable Fourdrinier Wire Doctor in detail.



WIRE DOCTOR COMPONENTS—
1. The cover. 2. The head assembly. 3. Vertical channel used to regulate camber. 4. Rectangular bar with inclined milled surfaces. 5. Flattened pin used to regulate the vertical movement of the channel. 6. Studs to regulate the horizontal movement of the bar. 7. The support beam.

LODDING
Engineering Corporation
AUBURN, MASSACHUSETTS

manufacturing facilities to accommodate a greatly expanded military program. This division employs more than 180 persons.

The merger was effected by the principals of the two divisions and assisted by the First Electronics Fund of Chicago.

Bowen Industrial Equipment, Ltd., Montreal, Quebec, Canada, has been appointed sales agency for Conoflow Corp., leading manufacturer of final control elements. J. Robert Simpson, Conoflow's sales manager, announced that the Bowen firm will be exclusive representative for Conoflow in the province of Quebec and the easternmost projection of Ontario.

Con J. Bowen, principal of the recently formed company, has extensive instrumentation and control valve experience. He received his engineering degree from the School of Technology, Luton, England, and has been active in the process control field since 1945, both in England and Canada.

Mailing address for Bowen Industrial Equipment, Ltd., is 4033 Decarie Blvd., Montreal, Quebec.

Conoflow Corp., a subsidiary of the Walworth Co., has plant and executive offices at 2100 Arch Street, Philadelphia 3, Pa.

J. P. Brezinski

C. B. Dahl

J. D. Parker

R. P. Mahoney

Beloit Iron Works, Beloit, Wis., has announced the following appointments.

J. P. Brezinski has been appointed director of paper process research. C. B. Dahl has been named director of the mechanical experimental department. Joseph D. Parker will serve as senior research associate and Ralph P. Mahoney has been designated supervisor of coating development.

These appointments have been brought about by the dramatic expansion of Beloit's research program. Also mentioned was that Beloit's new Research and Development Center will be completed during the first quarter of 1961.

Hardinge Manufacturing Co., York, Pa., has announced that McKeown and Associates are now its representative in the greater Philadelphia area, handling sales of "Meehanite" and "Ni-Hard" castings, machine shop work, plate steel work, pattern-making, and large custom machinery.

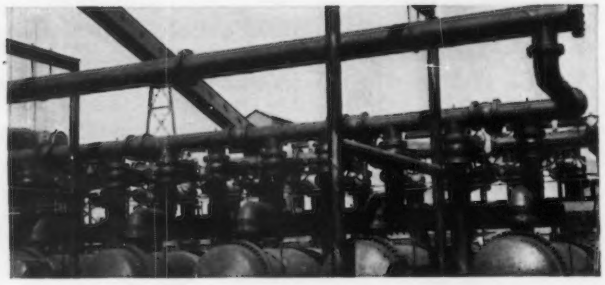
McKeown headquarters are at 47-2 Revere Road, Drexel Hill, Pa. Thomas F. McKeown was formerly connected with Johns-Manville in New York City. He came to Philadelphia in 1950 as sales manager of the Elliott Lewis Corp. of Philadelphia. Since 1952 he has been a manufacturer's agent in eastern Pennsylvania, southern New Jersey, Delaware and Maryland.

Tom Holt, McKeown sales associate, is a 1953 graduate of University of Pennsylvania, previously connected with Johnson and Johnson Co.

Armco plant piping features extra strength and high flow capacity

Pre-tested Armco Plant Piping, with uniform wall thickness to assure over-all strength, is ideal for white water, waste, stock, water supply and steam lines. And because each piece of pipe has a smooth interior, there is nothing to retard the flow of fluids. Lengths up to 60 feet mean you get the exact size you need.

Write today for your free copy of the catalog, "Armco Welded Steel Pipe for Industrial Uses." Armco Drainage & Metal Products, Inc., 6990 Curtis Street, Middletown, Ohio.



New steels are born at Armco

Steel

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Modern Methods of Mechanical Pulp Manufacture

This book comprehensively covers all aspects of groundwood pulp production. The author, K. H. Klemm, has a broad knowledge of groundwood manufacturing methods and has been associated with groundwood mills on both sides of the Atlantic. Price: $5.00.

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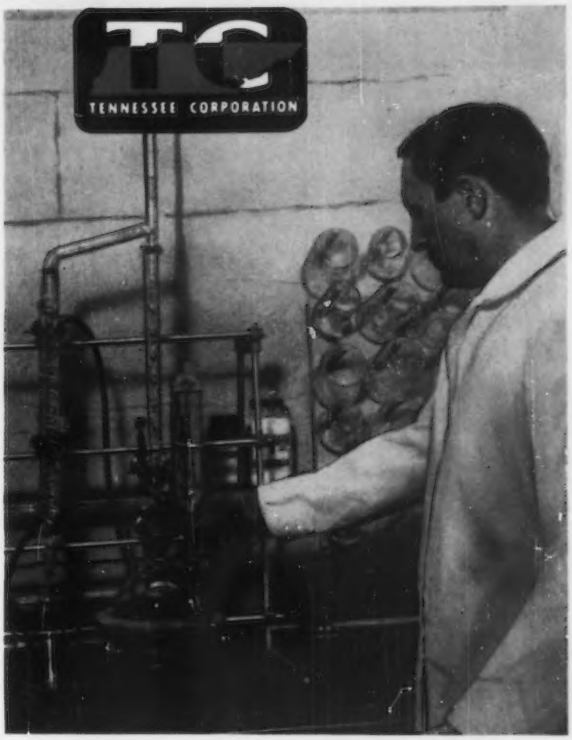

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612-629 Grant Building, Atlanta 3, Georgia

NEW EQUIPMENT

(Continued from page 35)

Fast Flow Rate Filter Aid Developed

A diatomite filter aid said to have a flow rate nearly double that of the fastest available filter aid materials has been developed by Johns-Manville. Called Celite 560, it makes possible the filtration of extremely viscous materials that could not previously be filtered with filter aids because of too low a permeability.

Extremely useful in the manufacture of plastics, resins and synthetic fibers and films, Celite 560 provides faster flow rates in the filtration of viscous liquids than Johns-Manville's Celite 545, up to this time said to be fastest flow rate diatomite filter aid available.

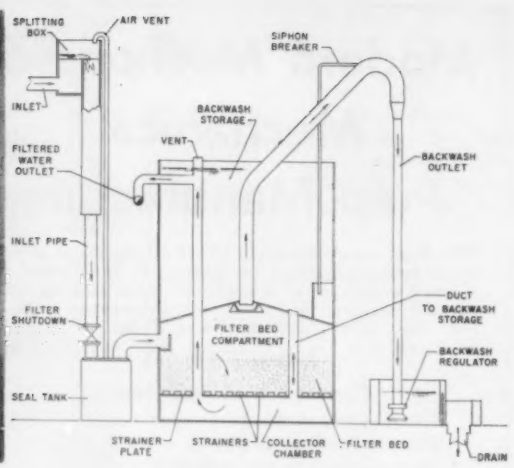
Celite 560 is shipped in 50 pound bags. Additional data is available from Johns-Manville, 22 East 40th Street, New York 16, N.Y.

Combination Truck and Drain Rack Loads Automatically

A standard combination truck and drain rack that is designed for users of solvents, cutting oils and deter-

gents, is being manufactured by Palmer-Shile Co., 12664 Mansfield Ave., Detroit 27, Mich.

The truck can be easily moved through crowded, narrow aisles and around heavy machinery. To load just tilt truck against drum, sliding steel fingers down to engage top rim of drum; then rock truck back to wheeling position, and loading is automatic. Slight downward push on truck handles raises wheels and lays rack on floor, thus providing convenient drain of drum. Equipped with detachable handles that may be removed to conserve floor space, one pair will serve any number of trucks. They are of all welded construction of heavy angle iron frame with sturdy steel tubing for handles and two eight-inch roller bearing wheels. Weight is approximately 90 lbs.



Valveless Filter Sets Own Backwash Cycle

The Permutit Co. has introduced a gravity water filter for municipal and industrial use that meets most criteria in these fields, including probably the two most important: very low initial cost versus designed performance, and fully-automatic operation requiring not one watt of power nor so much as the flick of an operator's wrist.

To achieve this, Permutit built its design around a very old device: the siphon. Combined with a filter bed in a compartmented tank, this siphon performs the backwash operation automatically, and there are no pumps, valves, gauges, or manual or electric controls anywhere in the unit. Actuation of the backwash cycle is accomplished at the optimum moment without any outside aid, the filter cannot over or under-wash, and backwash or rinse water cannot be accidentally run to service. The unit operates on a loss-of-head and can be used wherever gravity feed is feasible.

The Permutit Automatic Valveless Gravity Filter consists of a vertical cylindrical steel tank divided into three sections: backwash storage chamber, filter bed compartment, and collector chamber under a false bottom. The backwash storage space is designed to hold the optimum amount of backwash water in relation to the surface area of the filter bed below it. It fills to the same height and consequently gives a uniform amount of backwash on every cycle.

The filter bed contains standard fine filter sand supported on a collection system of disk-type plastic strainers, developed by Permutit. This system provides uniform collection of filtered water and uniform distribution of backwash water without the use of gravel. The unit can employ other types of filtering material, such as anthracite, or Neutralite, by simply modifying the rate of wash.

Permutit notes that the Valveless Filter has advantage over others in which the backwash is initiated by a time-cycle or visual inspection system. The time cycle method does not take into account possible variations in the quality of raw water, and visual inspection of the bed is not always a sure-fire indicator of the need for backwashing. Loss of head is the true indicator of the need for backwash, and the Valveless Filter is activated by this condition, say company spokesmen. For further information write Permutit Co., 53 West 43rd Street, New York 36, N.Y.

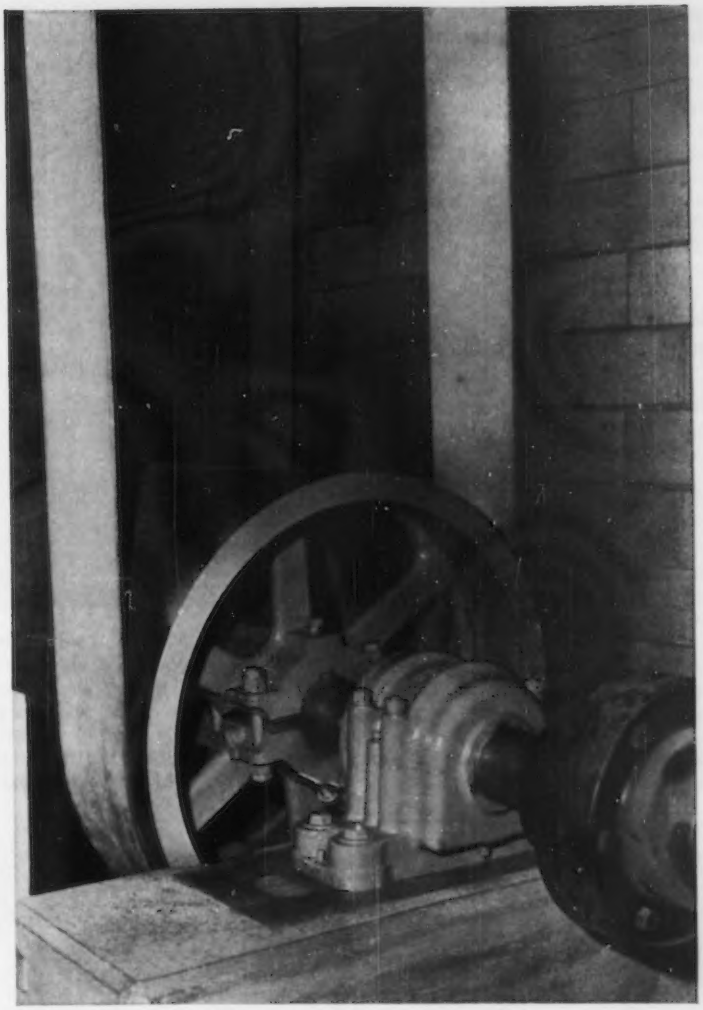
Gasket Compound For Semi Or Permanent Connections

An easy-to-apply gasket compound is available for leakproofing, gasketed assemblies. It also can be effectively used to repair broken gaskets, for building up damaged, misaligned or warped flanged surfaces, or as a gasket substitute where surfaces permit.

Known as Seal-Last, the gasket compound can be used for a wide variety of industrial fluids and gas services, including water, steam, oil or water-based hydraulic fluids, L-P and natural gases, petroleum products, mild corrosives and many chemicals. Temperature range is from —65° to +400° F., pressures to 5000 p.s.i.

It is available in two types: a soft-set variety for connections that must be periodically disassembled and a hard-set variety for permanent installations. Seal-Last Soft-Set Compound remains plastic to permit dismantling at any time without dam-

What drive engineers want to know about "no-stretch" Tanastic



Rhoads Tanastic on paper machine drive.

On the paper mill drive, illustrated, Tanastic, the leather/plastic belting by Rhoads, has been in operation over a year and has not been touched or adjusted. This stretch-free, trouble-free belt runs at highest speeds required in paper mill operation. Maintains tension, runs straight and true. Starts up without slipping. The same miracle properties are available at Rhoads in an all-synthetic belting — Texalon — with rubber coating. For feeder tapes, wet drives, pumps. That's why we say — at Rhoads the job selects the belt. Ask to see a Rhoads belt-drive engineer or write for new literature on Rhoads synthetic beltings. Address Engineering Department, J. E. RHOADS & SONS, Wilmington 99, Delaware.

RHOADS

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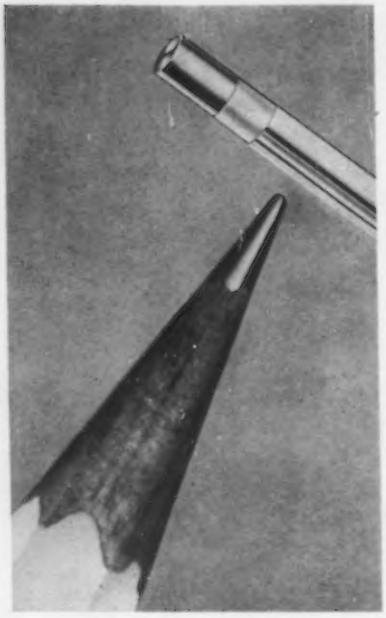
age to gaskets or mating surfaces. The hard-set type withstands vibration as well as contraction and expansion due to temperature change. Both types come in 1½ oz., 3 oz. and 11 oz. tubes. The two larger size tubes are supplied with a handy applicator cap for spreading the compound. For complete information contact Crane Packing Co., Dept. PJ-6, 6400 Oakton Street, Morton Grove, Ill.

Composite Anode For Cathodic Protection

A form of anode, for cathodic protection systems using impressed current, was announced this week by Electro Rust-Proofing Corp., a division of Wallace & Tiernan Inc., Belleville, N. J.

The anode, known as PTC-Clad, is a composite conductor which combines the high-current-carrying capacity of copper, the anodic-passive properties of tantalum, and the non-sacrificial qualities of platinum. Because of its wire form and its combination of electro-chemical properties, the PTC-Clad Anode makes possible the use of platinum for anodes which formerly would have been economically or technically impractical.



PTC-Clad Anodes are described as a core of copper, with high electrical conductivity, surrounded by an impenetrable covering of tantalum. Platinum forms the outermost coating. The tantalum sheath, which has the property of unidirectional conductivity in an electrolytic medium, prohibits the transfer of electric current from the anode surface to the electrolytic environment except through those areas which are covered with the non-sacrificial platinum.

Among the many advantages claimed for the PTC-Clad Anode are ease of installation, low installed cost, high current capacity, unusual flexibility in current distribution patterns. The anode is available in a size equivalent to the No. 10 copper wire conductor.

Information on the use of the new PTC-Clad Anode for cathodic protection systems is available from Electro Rust-Proofing Corp., 25 Main Street, Belleville, N. J.

Air-Break Contactor Compact Design Pacesetter

Introducing its 400 amp, 5-kv, 50 mva air-break contactor recently Allis-Chalmers (Milwaukee 1, Wis.) has led the breakthrough to a more compact design with its Space-Maker control concept. Two complete units can now occupy the same amount of space required previously for one unit.

The Type 465 contactor is the first

"Known by the Reliability of its Service as well as the Quality of its Product"
GREAT EASTERN
GE
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Service
Reliability
GREAT EASTERN
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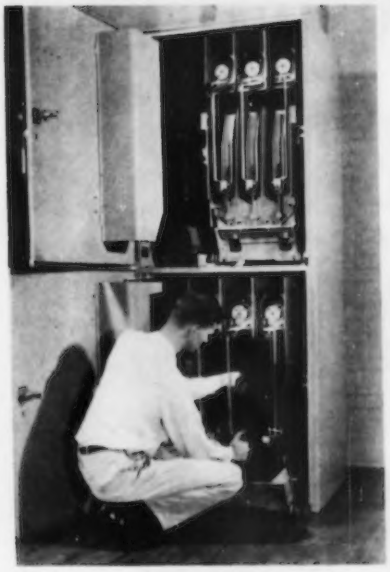

in the industry to use the new glass polyester Super Pyro-Shield insulations. All insulation in contact with high voltage current-carrying parts is flame-retardant and track resistant. Super Pyro-Shield insulation replaces sheet metal wherever possible.

Faster and easier inspection was another goal attained. No special tools are required. Arc chutes and barriers are lifted out easily. Pole pieces are rotatable to expose the complete contact structure of all three phases without any obstruction.

Coils, too, can be changed quickly by removing one bolt and the coil connections. Use of a clapper type magnet puts all frictional moving surfaces where motion is small and driving forces high.

Of double-break construction with floating guides to do away with flexible leads, the 45 degree contacts allow natural arc movement into the chute. The design also promotes a wedging action for higher effective contact pressures. Dust and dirt slide off, which helps to keep contacts cleaner.

Dimensions of the Space-Maker contactor are 24-in. deep, 16-in. wide, and 28-in. high. The contactor meets all AIEE and NEMA standard tests. All components were separately tested to provide individual ratings and mechanical strength. In addition, the complete control unit was tested to meet the following ratings: (1.) 60-kv impulse level; (2.) Ability to withstand mechanical stresses of rated short-circuit capacity of 50 mva; (3.) 15-kv, 60 cycle test for one minute; and (4.) Continuous current rating of 400 amp.

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Delivered Basis

	U.S.	Canadian	Swedish	Finnish	Norwegian
Groundwood	$ 92.50/ 90.00	$82.50/ 90.00	§890.00/ —	§850.00/ —	§890.00/ —
Bleached Gw'd.	$ 97.50/100.00	$97.50/100.00			
Kraft, Blchd.	‡135.00/150.00	140.00/150.00			§157.50/ —
Kraft, Blchd. Hdwd.	135.00/140.00		140.00/ —		
Kraft, Semi-bleached.	130.00/140.00				
Kraft, Unbl.	117.50/125.00	125.00/ —	†125.00/130.00	125.00/ —	
Sulphite, Blchd.	135.00/140.00	135.00/140.00	°155.00/ —	°155.00/ —	155.00/ —
Sulphite, Bl. Hdwd.	135.00/ —				
Sulphite, Unblchd.	135.00/ —	135.00/ —	†135.00/ —	°135.00/ —	
Sulphite, Unb'l. Gl'sn.		140.00/ —	†134.00/ —		
Soda, Blchd.	130.00/135.00	130.00/135.00			

§ On Dock Atlantic Ports. ° Freight allowed. † Varying Freight Allowances.
‡ Depending on Brightness.

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F.O.B. OIL MILLS
WEEK ENDED NOVEMBER 29

	Atlanta	Memphis	Dallas	Los Angeles
Grade 1	n.a.	n.a.	n.a.	n.a.
2	$8.00/7.75	n.a.	n.a.	8.00/7.50
3	7.75/6.75	$7.50/7.25	$7.50/7.00	7.25/6.75
4	6.75/6.00	6.50/6.25	6.50/6.25	6.50/6.25
5	6.00/5.50	6.00/5.75	6.00/5.50	— /6.00
6	5.50/4.50	5.25/5.00	5.25/5.00	5.00/4.00
7	4.50/4.00	4.50/4.00	4.75/4.00	n.a.

WASTE PAPER MARKET

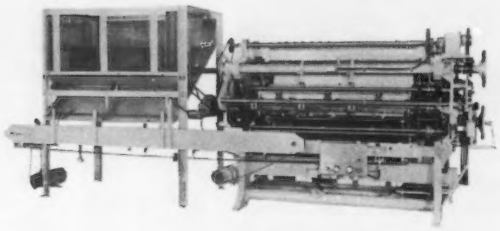
Mill Prices, f.o.b. Trucks Shipping Point — Includes Brokerage

These quotations are a partial indication of the price range on volume tonnage in each market on the date specified, as gathered from major dealers and brokers. SPECIAL PACKINGS AND SPOT TONNAGE NOT INCLUDED. Prices nominal.

	New York	Boston	Chicago	Los Angeles
	Dec. 5	Dec. 5	Dec.	Dec.
No. 1 Mixed Paper	$ 7.00/ 9.00	4.00/ 7.00	6.00/ —	12.00/ —
No. 1 News	12.00/ 13.00	11.00/ —	11.00/ —	12.00/ —
Overissue News (Lg. size)	11.00/ 13.00	9.00/ 11.00	16.00/ —	18.00/ —
Mill Wrappers	19.00/ 22.00	9.00/ 11.00	9.00/ —	13.00/ —
Old Corrugated Containers	19.00/ 20.00	17.50/ 18.00	18.00/ —	17.00/ 18.00
Super Resorted Kraft Paper	35.00/ 40.00	— / —	28.00/ —	50.00/ 55.00
New Double Kr. Ld. Corr. Cuts	27.50/ 30.00	32.50/ 35.00	30.00/ —	27.50/ 30.00
(Semi-chem. medium)	45.00/ —	45.00/ —	42.50/ —	— / —
New 100% Kraft Corr. Cuts	40.00/ 42.50		52.50/ —	— / —
New Br. Kraft, Env. Cuts	65.00/ 70.00	65.00/ 70.00	47.50/ —	55.00/ 60.00
New Br. Kr. Bag Waste Prntd.	50.00/ 55.00	55.00/ 65.00	47.50/ —	45.00/ 50.00
New Br. Kr. Bag Waste Unprintd.	55.00/ 60.00	65.00/ 70.00	55.00/ —	50.00/ 55.00
No. 1 Groundwood Shvs.	25.00/ 30.00	20.00/ 25.00	10.00/ —	30.00/ 32.50
White Newsblanks	42.50/ 45.00	47.50/ 52.50	30.00/ —	55.00/ —
No. 1 Soft White Shvs.	55.00/ 60.00	55.00/ 60.00	50.00/ —	75.00/ —
Super Soft White Shvs.	45.00/ 75.00	70.00/ 80.00	60.00/ —	— / —
Hd. White Shvs.	75.00/ 80.00	80.00/ 90.00	75.00/ —	85.00/ —
Hd. White Env. Cuts	90.00/ 95.00	100.00/105.00	80.00/ —	103.00/ —
Col. Tab. Cards	40.00/ 42.50	40.00/ 42.50	37.50/ —	35.00/ 40.00
Manila Tab. Cards	57.50/ 60.00	57.50/ 60.00	55.00/ —	60.00/ 65.00
No. 1 Col. Ledger	32.50/ 35.00	32.50/ 37.50	40.00/ —	24.00/ 27.00
White Ledger	45.00/ 50.00	47.50/ 52.50	50.00/ —	45.00/ 55.00
Mixed Book & Mag.†	— / —	— / —	10.00/ —	— / —
No. 1 Books‡	15.00/ 17.50	22.00/ 24.00	25.00/ —	10.00/ 12.00

† Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% of groundwood.

Creative engineering
and development
of converting machinery



New Automatic Core Loader — loads up to 15 long cores per minute! This new PCMCo loader, Model 2765, has a new system for feeding and positioning cores, using a simple conveyor and pushing action with no reciprocating mass. An exclusive roller system guides the mandrel into the incoming core for positive feed and positioning. Cull discharge and storage plus log storage facilities and slit roll discharge are other production-slanted design features. Just right for coordination with a Paper Converting automatic rewinder. One of the important new converting machines from the builder you should think of first.

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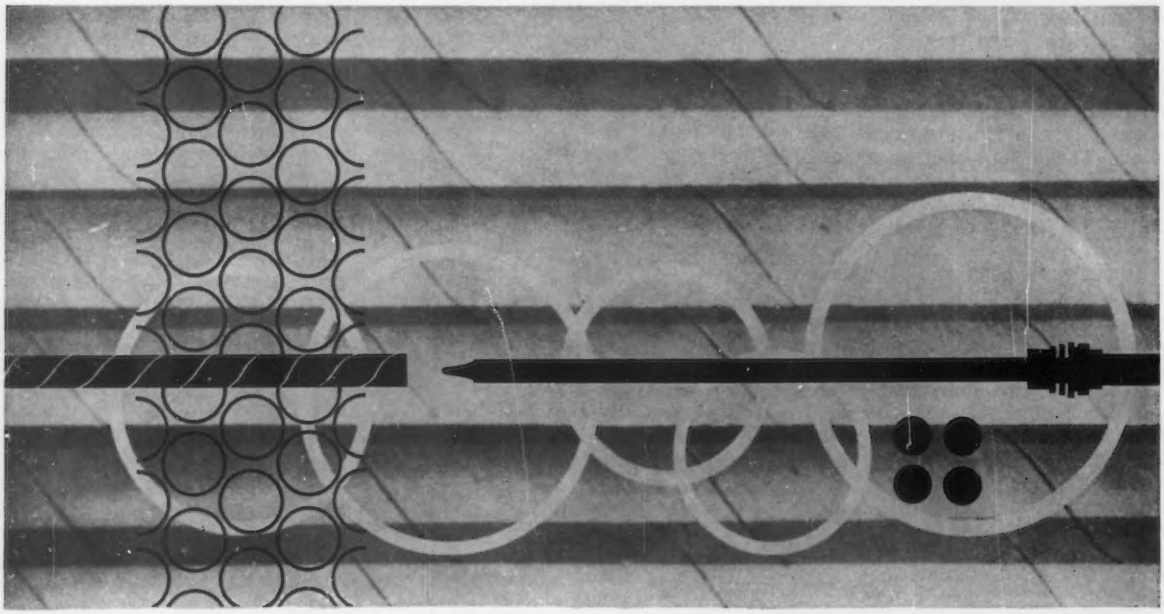

THIS PULP WAS MADE AT A MILL THAT DOES NOT YET EXIST!

The mill will be our new 85,000-ton plant at Woodfibre, British Columbia. It won't be on stream until May, 1961—but when it is, it will turn out a paper-making pulp identical to the piece attached to this page!

Here's how we did it: Since the equipment at our new mill will be so like that at our successful Jesup, Georgia operation, we simply shipped British Columbia wood to Jesup. There we used the Woodfibre process and sequencing to make a true advance copy of the exceptional new pulp, Fibrenier.

New advanced pulps: Fibrenier is but the first of a new series of paper-making pulps to come from this new mill, specifically designed to produce paper-making pulps of distinction, competitively priced. Like all pulps in our line (the world's most complete), Fibrenier results from years-ahead research . . . is backed by the self-same technical service, policy and management interest in the paper industry which have won Rayonier respect and confidence world-wide.

Find out for yourself just how great Fibrenier is. Call your Rayonier representative collect. Samples and tonnage quantities are available. Or write for complete data. No obligation, of course.

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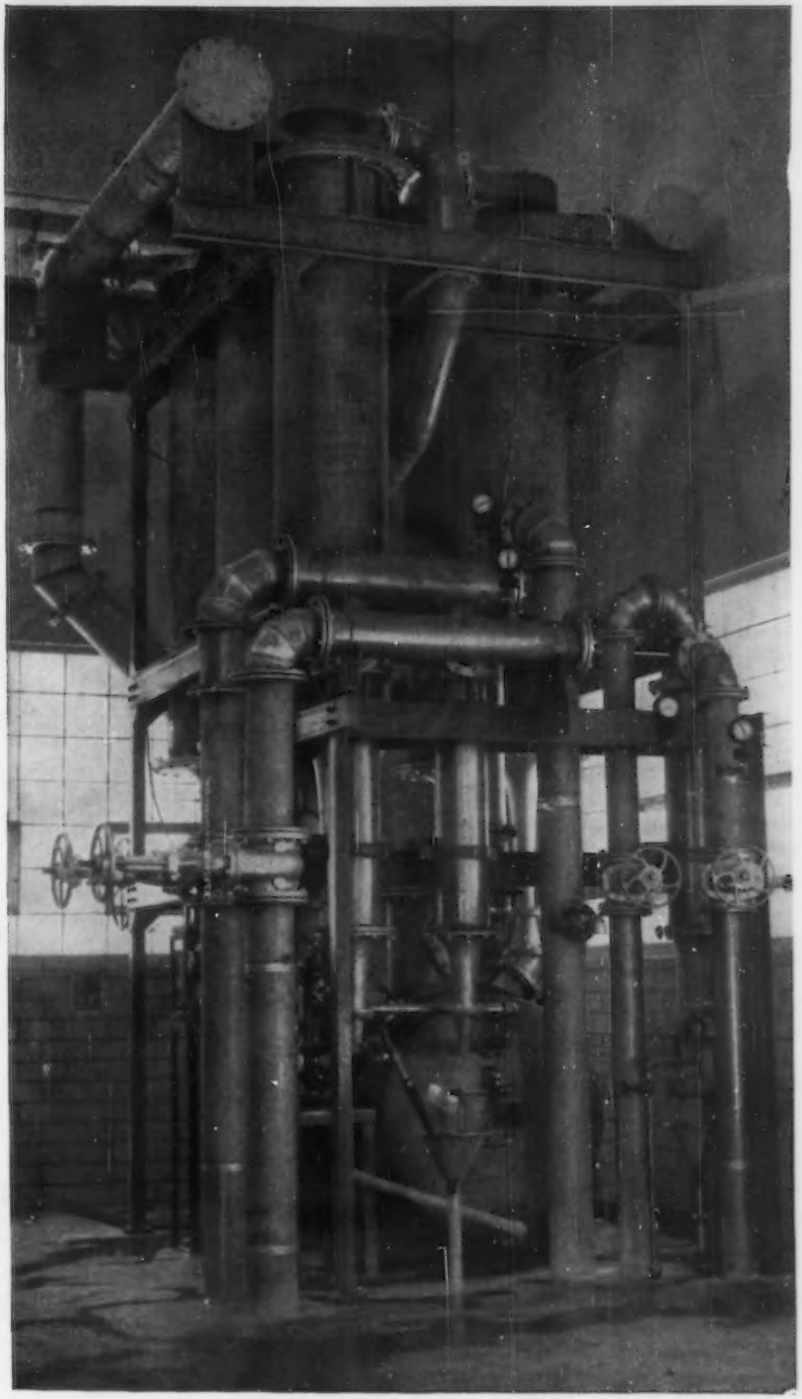
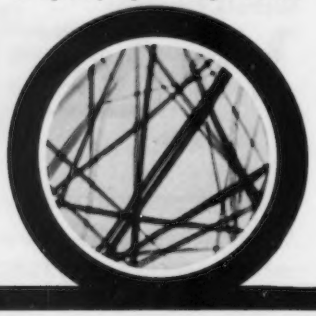


PAPELERA PULPA-CUBA S.A., TRINIDAD, CUBA

This new integrated pulp and paper mill produces 100 tons per day of high grade bleached and unbleached papers from sugar cane bagasse fiber. Our Organization supplied this project with technical assistance and the major production equipment including a Horkel System for depithing and cleaning the raw bagasse, a Pandia Continuous Digester and the Black-Clawson fourdrinier paper machine shown here.

Completely depithed bagasse fibers



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Under a package contract, we supplied principal equipment and start-up assistance for the recent expansion of this mill to produce 60 metric tons per day of unbleached wheat straw pulp for corrugating medium. Straw processing and pulping in a Pandia Continuous Digester is accomplished in this compact, semi-enclosed installation.

These Latin American projects are but two of the 25 pulp and paper mills throughout the world for which the Parsons & Whittemore-Lyddon Organization has provided full or partial planning, technical, economic, and construction services. Twelve different papermaking fibers are utilized among these projects. We even supervise start-up and train local operating personnel, and can arrange for sale of the output on world markets. For literature and full information on how our services can benefit your mill projects, write our nearest office.

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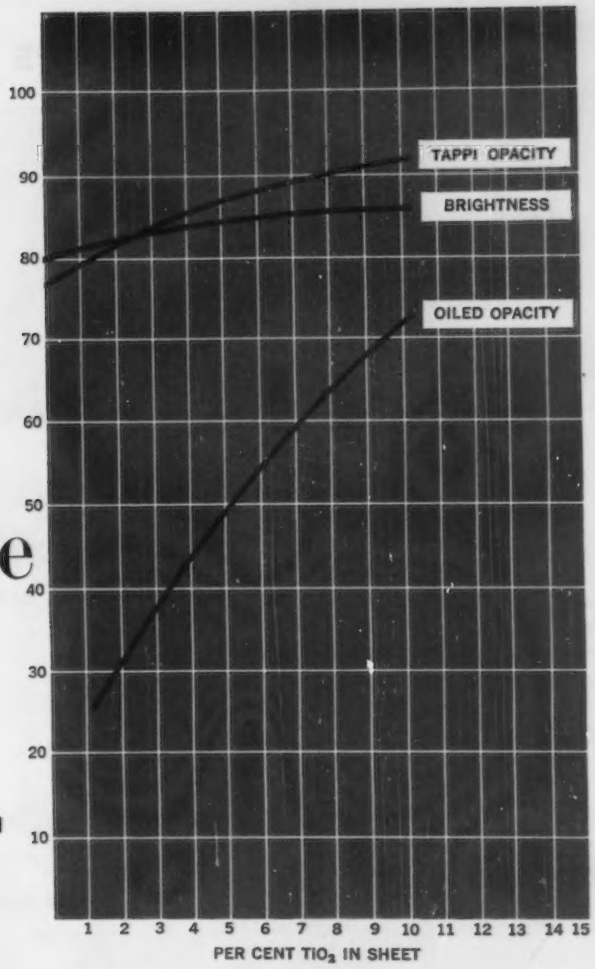

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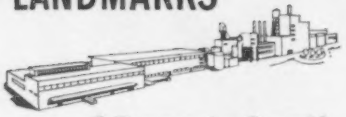

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Figures of the Week

PAPER PRODUCTION RATIO REPORT—American Paper & Pulp Assn. Figures

(Production as per cent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

	Oct. 29	Nov. 5	Nov. 12	Nov. 19	Nov. 26
1960	95.8r	91.8r	96.7r	90.1r	84.4
	Oct. 31	**Nov. 7**	**Nov. 14**	**Nov. 21**	**Nov. 28**
1959	97.8	94.6	96.5	96.3	93.8

r Revised.

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1960	96.5	97.7	98.1	96.9	97.6	96.1	81.2	91.7	89.1‡	94.6‡	—	—	—
1959	87.8	90.5	93.2	94.4	95.5	95.6	84.5	96.0	92.4	97.4	96.2	86.6	92.2

‡ Preliminary.

COMPARATIVE YEARLY SUMMARIES

	1953	1954	1955	1956	1957	1958	1959	1960
Year to Date	94.2	92.0	96.5	98.5	91.1	87.3	92.8	93.7
Year Average	92.3	91.6	96.2	97.9	90.4	87.0	92.2	—

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available.

PAPERBOARD OPERATING RATIOS†—National Paperboard Assn. Figures

COMPARATIVE WEEKLY SUMMARIES

	Oct. 29	Nov. 5	Nov. 12	Nov. 19	Nov. 26
1960	91	88	92	89	81
	Oct. 31	**Nov. 7**	**Nov. 14**	**Nov. 21**	**Nov. 28**
1959	96	94	95	95	91

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1960	92	95	94	92	94	92	78	93	87	93	—	—	—
1959	89	94	95	94	96	96	83	97	92	96	94	80	92

‡Preliminary.

† Per cents of operation based on "inch-hours" reported on a 6-day basis to the National Paperboard Association.

SUMMARY OF PAPERBOARD STATISTICS—National Paperboard Assn. Figures

ITEM	WEEK ENDING Nov. 26, 1960	WEEK ENDING Nov. 19, 1960	CUMULATIVE TO DATE Jan. 1, 1960 to Nov. 26, 1960
% Activity	81%	89%	91%
Total	270,596	309,245	14,527,318
Containerboard—Domestic Use.	135,541	158,838	7,502,735
Liner	93,205	109,795	5,036,169
Corrugating Material	37,809	45,238	2,230,689
Chip & Filler Board	4,527	3,805	235,877
Boxboard—Domestic Use	84,279	92,434	4,463,122
Folding	47,755	56,801	2,672,992
Set-Up	8,993	10,283	507,140
Special Food Board	27,531	25,350	1,282,990
Other Paperboard	50,776	57,973	2,561,461
Containerboard Type	22,988	26,790	1,224,010
Boxboard Type	27,788	31,183	1,337,451
Total Orders			
Received	261,948	283,461	
Unfilled End of Week	384,818	393,601	

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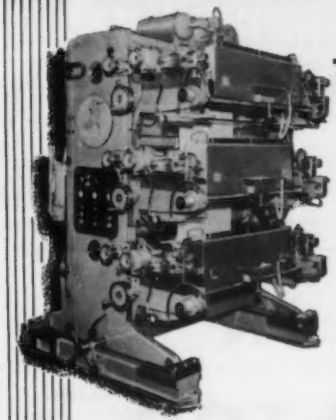

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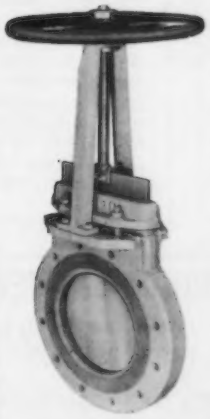

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- 3— 73" face w/gears & bearings
- 3— 76" face w/gears & bearings
- 3— 77" face w/gears & bearings
- 2— 84" face
- 2— 84" face w/accessories

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- 1— 42" face
- 2— 44" face; 2—46" face
- 4— 70" face w/gears & bearings
- 11— 72" face w/gears & bearings
- 1— 74" face Lukenweld w/A-F Brng
- 9— 75" face w/gears & bearings
- 26— 76" face; complete section
- 9— 76" face w/gears & bearings
- 2— 77" face w/gears & bearings
- 1— 78" face w/gears & bearings
- 2— 80" face
- 5— 84" face
- 30— 84" face; complete section
- 18— 90" face; complete section
- 9— 92" face; complete section
- 1— 96" face
- 1—138" face
- 10—160" face

42" Dia.:
- 23— 76" face; complete section
- 46— 96" face w/gears, frames & bearings
- 1—120" face
- 1—160" face

48" Dia:
- 49— 46" face; chrome plated
- 12— 82" face; complete section
- 3—84" face
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2— 12 plate IMPCO w/Dunbar Drives
8— 14 plate IMPCO—Bronze Vats S.S. Plates

INLETS & HEADBOXES
1—106" Valley w/8" distributing roll
1—131" Valley w/10" distributing roll; SS lined
1—131" Beloit Pressure Type; SS rolls—1100 f.p.m.

JORDANS
2—Appleton #1 w/A-F Brng
1—Horne w/A-F Brngs
4—Shartle Miami #2 w/A-F Brngs
1—Jones Midget—Used 2 months

MOTORS 3 PH 60 CYCLE
1—100 h.p. GE; 440 v; 695 r.p.m.
1—250 h.p. West. syn. 440V., 450 r.p.m.
1—300 h.p. West; 2200 v; 503 r.p.m.
1—350 h.p. GE; 2200 v; 720 r.p.m.: Synch

PAPER MACHINE DRIVES
1—De Laval 100 h.p. steam turbine w/reducers

PULP MILL EQUIPMENT
1—Lannoye #1 Pulper
1—Murray 2 deck Chip Screen, 5 ft x 14 ft.

PUMPS—OPEN IMPELLER
1—Shartle 10 x 20 Duplex
47—Centrifugal Stock and Water Pumps

REELS
1—100" Kohler automatic two arm unwind reel; 60" dia rolls; new condition
1—109" two bowl upright
1—123" Beloit—2 bowl
1—126" Beloit Aldrich surface drive type
1—146" B & S pope type w/Reliance drive

REFINERS
2—Jones Fibremasters—Lava Filling—New.
2—#1 Claffin; A-F Brng
1—24" Bauer Double Disc w/two 50 h.p. motors
1—24" Downingtown Weiner; new
1—36" Bauer, Model 185 w/2—75 h.p. motors
1—Dilts #4 Hydrafiner
1—Dilts 36" Classifiners AF Brng.
1—Claflin #2—New fillings AF Brng.

ROLL GRINDERS
1—124" x 30" Farrel w/crowning device
1—208" x 32" Farrel w/crowning device

ROLLS
Distributor—Stainless Steel
- 2— 8" dia x 115" face
- 1— 6½" dia x 115" face

Couch—Rubber Covered
- 20 Misc. Sizes Dwngs Available

Press—Rubber or Brass Covered
- 71 Miscellaneous sizes. Drawings available

Felt—Steel, Brass, Rubber Covered
- 335 Miscellaneous sizes. Drawings available

Calender—Chilled Iron
- 72 Miscellaneous sizes. Drawings available

ROTARY SCREENS
5—Bird #3A, Model 100 w/copper vats
1—Jones Leithwalk copper lined

SHEETERS—WITH BACKSTANDS
2— 45" Beck w/layboy
1— 50" Finley
6— 56", 60", 66" & 70" Hamblets
1— 65" Kidder w/elec. eye and layboy
1— 74" Hamblet w/motor
1— 76" Beloit Duplex
1— 82" Hamblet
1— 85" Hamblet duplex w/layboy
1—105" Hamblet
1—112" Beloit Duplex Board Cutter; A-F Brng

SLITTERS & REWINDERS
17¼" Maximum Rewind Diameter
- 2— 42" Cameron Type 26-2A

24" Maximum Rewind Diameter
- 3— 42" Cameron Type 6
- 1— 42" Cameron Type 6 Shear Cut
- 1— 62" Cameron Model 6
- 1— 62" Cameron Type 8
- 1— 72" Cameron Type 9-5

30" Maximum Rewind Diameter
- 1— 52" Cameron Type 10
- 1— 60" Langston Shear Cut
- 1— 72" Cameron Type 10; A-F Brng
- 1— 72" Cameron Type 10 Shear Cut; A-F

36" Maximum Rewind Diameter
- 1— 70" Variable Speed Center Winder
- 1— 62" Cameron 8-10
- 1— 72" Cameron Model 8-10
- 1— 82" Cameron 10-11; A.F. Brng.

42" Maximum Rewind Diameter
- 1— 40" Egan Shear Cut; A-F Brng
- 1— 60" Kidder Model SH Low Bed
- 1— 72" Beloit Shear Cut
- 1—136" Cameron Type 18; A-F Brng
- 1—161" Cameron Type 18 w/60 h.p. Reliance VS Drive

48" Maximum Rewind Diameter
- 1— 86" M & W Four Drum Shear Cut
- 1—152" Langston Shear Cut

60" Maximum Rewind Diameter
- 1—112" Cameron Type 18
- 1—120" M & W two drum w/75 h.p. drive
- 1—120" Langston
- 1—136" Langston; AF Brng; shear cut

SLITTERS & REWINDERS—DOUBLE REWIND
18" Maximum Rewind Diameter
- 1— 42" Cameron 26-7D for Cellophane
- 1— 52" Cameron Type 26-3A

30" Maximum Rewind Diameter
- 1— 42" Essex Shear Cut; A-F Brng
- 1— 42" Cameron Type 28-3
- 1— 92" Cameron Type 28-3 w/ vari-drive

STOCK CLEANERS
2—1000 g.p.m. Shartle Hydrafuges w/motors
14—Bird Dirtecs; 2" & 6" bronze
1—Bird Dirtec 12". Rebuilt by Bird
21—4" Vortraps—Bronze

STOCK REGULATORS
2—Braemer SS; 25 t/d cap; Foxboro controls
2—Poirier; 25T /D cap

SUCTION COUCH ROLLS
1—125" face x 18" dia—bronze brng
1—160" face x 30" dia—roller brng

SUCTION EXTRACTOR ROLLS—DOWNINGTOWN
1—105" face x 19" dia
1—126" face x 22" dia; complete section
1—134" face x 18" dia.; A-F Brng

SUCTION PRESS SECTIONS
1—120" face x 18" dia—R.C.—Roller brng
1—114" face x 20¼" dia. R. C. Complete section

SUPERCALENDERS
2— 30" Norwood 4 roll
2— 63" Norwood 8 roll; A-F Brng
1— 92" Norwood 7 roll w/drive

TOWEL & NAPKIN FOLDERS
1—Hudson Sharp 50", single fold—towel
2—Paper Converting ¼ fold—napkin
1—Paper Converting single fold—towel

THICKENERS
2—Shartle Cylinders 130" x 42"—16" R.C. Couches

TRIMMERS—POWER BACK GAUGES
1— 38" Seybold w/motors
1— 50" Seybold Twentieth Century
1— 57" Seybold Precision
2— 65", 84" Seybold Daytons

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1— 34" Cameron Type CT
1— 52" Cameron Type CT
1— 72" Cameron—water cooled brake
1— 82" Cameron—water cooled brake

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D-12

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D-12

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D-26

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D-19

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J-23

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D-26

Wanted

WANTED

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Wanted

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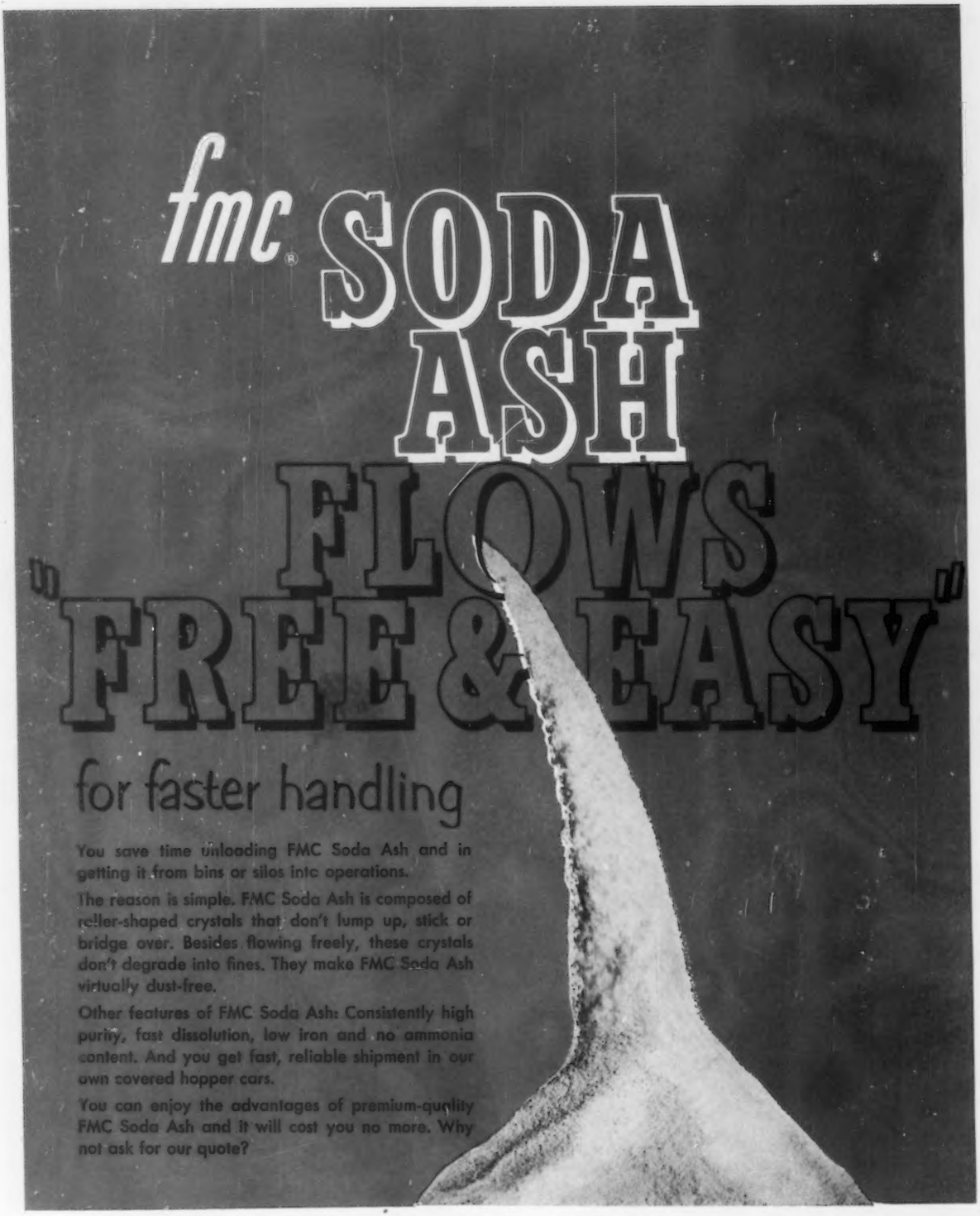
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